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SOME RESULTS OBTAINED IN THE DESTRUCTIVE DISTILLATION OF LINSEED OIL.[1]

WITH REMARKS ON ITS BEARING ON ENGLER'S THEORY OF THE ORIGIN OF PETROLEUM.

BY SAMUEL P. SADTLER.

It is well known that, in boiling linseed oil for varnish-making and similar purposes, inflammable vapors are given off, the boiling being continued often until they burn freely. Very little has been noted with regard to the character of these vapors, and I know of no special study of them. During the past winter, in connection with the examination of some boiled oil driers for the Atlantic Drier Company, of Philadelphia, I was surprised to find some 40 per cent. of neutral petroleum-like oils in the product. The natural explanation of adulteration with mineral oils being out of the question in this case, I was led to ask as to the process used for the preparation of the boiled oil. I found that it was boiled under pressure, and that considerable quantities of a liquid distillate were being condensed in the dome of the large still and returned to the material in the still. I had the process carried out for me specially and so arranged that I could collect the product of this destructive distillation of the linseed oil, for so it proved to be.

At first the odor of acrolein was very pronounced and powerful, showing that the glycerin of the glycerides composing the oil was being decomposed; later the odor was more that of a cracked

[1] Presented at the Montreal meeting of the American Pharmaceutical Association.

petroleum oil, showing that the linoleic and other acids of the oil were undergoing decomposition. I submit a sample of the linseed oil used. It was a clear "old process" oil, of specific gravity 0·929, and showing a saponification equivalent of 183, which is normal for linseed oil. The raw distillate collected after this acrolein odor had nearly disappeared I also show. It had a specific gravity of 0 860 and a saponification equivalent of 1·09, showing that it had been nearly all converted into a neutral hydrocarbon oil.

This was then redistilled from a small iron retort and two fractions collected, leaving a residue in the retort which had the appearance of petroleum residuum or reduced oil, such as is used in the manufacture of vaseline and similar products. The two fractions were then treated with sulphuric acid, as is done in purifying petroleum distillate, and the results are shown in the samples submitted. They resemble quite strongly what is called paraffin oils, showing the characteristic fluorescence of these latter.

From a portion of one of these fractions on chilling in a freezing mixture scale paraffin was also separated, a sample of which I submit.

These results, while they can only be considered as preliminary, are sufficient to show that we have hydrocarbon oils analogous to the natural petroleum or mineral oils formed in the distillation of linseed oil under pressure. I have not yet extended this line of experiment to the other seed oils, such as cotton-seed and rape-seed oils, but believe it to be very probable that similar results could be obtained from them. I expect to do this as well as study more fully the products already obtained. I may be allowed to call attention to what seems to me to be the importance of these results in their bearing on some well-known work of Prof. Carl Engler, of Carlsruhe, Germany. In 1888 and 1889 Prof. Engler published in the *Berichte der deut. chem. Gesellschaft* (**21**, p. 1816 and **22**, p. 592), the results of experiment on the distillation of menhaden oil under pressure. He began at a pressure of 10 atmospheres and ended at 4 atmospheres. A distillate came over at 325° to 400° C., and was approximately 60 per cent. of the oil taken.

The new distillate was of brownish color, transparent in thin layers, and of a strong green fluorescence. Its odor was not unpleasant, and contained no recognizable amount of acrolein. The specific gravity of this distillate was 0·8105.

On the basis of these results Engler propounded a theory, which has been extensively discussed and generally accepted, that animal remains seem to be indicated as the main source of the formation of our petroleum deposits. His view, as expressed in the paper referred to, is that while the nitrogenous tissue of these animal deposits has disappeared as the most ready alterable portion, the fatty tissues have undergone a slow destructive distillation under pressure with the formation of our petroleum oils.

In the light of the results presented in this note on the destructive distillation of linseed oil, it is difficult to see how we can avoid widening Engler's theory so as to include the vegetable seed oils as probable additional sources of the petroleum oil formation. Moreover, I see no reason, if lard oil will yield the results which Engler has obtained, to doubt that vegetable oleins, like olive oil and its class, may also be found to be capable of the same changes.

Professor Engler showed at the World's Fair Congress of Chemists, in 1893, a refined burning oil and scale paraffin which had been obtained by him from fish oil. I have here the corresponding product, including the scale paraffin from linseed oil.

HISTORY AND NAMES OF RHAMNUS PURSHIANA (CASCARA SAGRADA).[1]

By J. U. Lloyd.

Contribution of the Research Committee of the American Pharmaceutical Association.[2]

In a paper contributed to *New Preparations*,[3] October 15, 1877, p. 8, the late Dr. J. H. Bundy, an eclectic physician of Colusa, Cal., recommended cascara sagrada as a valuable remedy in the treatment of constipation. This notice was by means of a brief note that was part of a paper on Berberis aquifolium, Dr. Bundy promising, however, to give it further attention, as follows:

"It is not my purpose to treat on cascara sagrada in this paper; but, using it in connection with the Berberis, I simply make men-

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[1] Presented at the meeting of the American Pharmaceutical Association, Montreal, 1896.

[2] Introductory to a contribution on a chemical investigation of Rhamnus purshiana, undertaken by Alfred R. L. Dohme.

[3] *New Preparations.* Detroit: Parke, Davis & Co.

tion of it. In the future I will introduce this drug to the profession."

This, so far as the writer can determine, was the first reference concerning this remedy in pharmaceutical or medical print. Agreeably to promise, in January, 1878,[4] Dr. Bundy contributed a paper on the subject of cascara sagrada, in which he gave the uses of fluid extract of cascara sagrada. Following this came many papers from Dr. Bundy and other physicians, twenty contributions on the subject being printed in *New Preparations*, 1878, to which journal, with few exceptions, the subject was confined during 1877 and 1878. Dr. Bundy stated in his paper (1878) that: "A description of the cascara I am unable to give at this time; but suffice it to say that it is a shrub, and in due time its botanical name will be known." He neglected, however, to concern himself further in the matter.

In the fall of 1878, Dr. C. H. Adair, of Colusa, Cal., a partner of Dr. Bundy, sent the writer specimens of the bark and botanical specimens of the tree yielding it. These, on identification by Mr. Curtis G. Lloyd, proved to be Rhamnus purshiana. This fact was announced in a paper on "Some Specimens of Western Plants," presented at the meeting of the American Pharmaceutical Association held in Atlanta, Ga., November, 1878 (*Proceedings*, 1879, p. 707), and completed the drug's history.

Names.—Dr. Bundy supplied the drug under the Spanish name, cascara sagrada, which name is said to have been in local use throughout some sections of California, and soon came to be the common name of the drug. It will surely dominate all others as long as the drug is in use. The Anglicized name, sacred bark, has also been applied to the drug, and the Scriptural term, *Chittim bark*, was also employed in early days in some parts of California; but these last names are now obsolete.

Summary.—To Dr. J. H. Bundy, Colusa, Cal., 1877, is due the credit of introducing the bark of Rhamnus purshiana (cascara sagrada) to the medical profession.

To *New Preparations*, Parke, Davis & Co., of Detroit, Mich. (1877 and 1878), is due the credit of bringing the drug to the attention of physicians and pharmacists.

To Parke, Davis & Co., of Detroit, Mich. (1878), is due the credit

[4] *New Preparations*, January, 1878, p. 1.

of making the first pharmaceutical preparation (the fluid extract), and of bringing this preparation into general conspicuity through their advertisements and business connections. It may be said, without danger of controversy, that this firm introduced and established cascara sagrada as a remedy.

To Dr. C. H. Adair (1878), of Colusa, Cal., is due the credit of furnishing the botanical specimens that established the drug's botanical position.

ON THE CHEMICAL COMPOSITION OF THE OIL FROM MONARDA PUNCTATA, L.[1]

By William Robert Schumann and Edward Kremers.

In a paper on the "Chemical Composition of the Volatile Oil from Monarda Fistulosa,"[2] one of us called attention to the fact that although examinations of four specimens of Monarda punctata have been recorded, none of these specimens are authentic.

In 1846 an oil of horsemint, supposed to be derived from Monarda punctata, was examined by Arppe.[3] In 1888 an examination of oils supposed to be obtained from Monarda punctata was made by Mr. Schroeter.[4] One sample of oil was taken from the cabinet of the Philadelphia College of Pharmacy, where it had been standing for six years, during which time it had deposited crystals of thymol. The other two specimens were evidently obtained in the open market, from reliable sources. However, for none of the four specimens of oil heretofore examined is there any positive guarantee given as to their source. Arppe separated mechanically a crystalline stearopten, evidently thymol, which had been deposited upon standing. Schroeter states that the oil contains a hydrocarbon of the formula $C_{10}H_{16}$; thymol, "which is dextrogyrate;" a compound, $C_{10}H_{18}O$, boiling between 240°–250°, and formic, acetic and butyric acids.

The oils used, the methods employed, as well as the description of some of the results, *e. g.*, the rotatory power of the optically

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[1] Presented at the Montreal Meeting of the American Pharmaceutical Association.

[2] *Proc. Am. Phar. Assoc.*, 43, 256.

[3] *Annalen d. Chem. und Pharm.*, 58, 41.

[4] Am. Jour. Pharmacy, 1888, p. 113.

inactive thymol, did not inspire confidence. Some of these odd statements have crept into the literature of volatile oils. Thus Bornemann calls attention to the supposed difference in rotatory power between thymol of oil of thyme, and that from Monarda. He also mentions that the thymol from fresh Monarda oil is non-crystallizable, whereas the crystallizability of the thymol increases with the age of the oil.

Experimental Part.—In view of the interesting results obtained upon examination of the oil from Monarda fistulosa obtained from authentic material, and some of the discrepancies that have crept into literature on the subject, another examination seemed called for. The material from which the oil was obtained was collected early in August, near Pine Bluff, about fifteen miles west of Madison, and was identified by Prof. L. S. Cheney, of the University of Wisconsin.

The flowering herb was distilled with water vapor, while still fresh, about one-half a pound of oil being obtained. The oil was of an amber or light-yellowish color, with a pleasant yet characteristic mint-like odor, sp. gr. 0·9307 at 20°. It turned the plane of polarization 0 05479 to the right at 20°, hence

$$[A]_D = + 0{\cdot}0588$$

Separation of Phenol.—In order to remove the phenol the oil was shaken with 10 per cent. caustic soda solution.

(1) From 25 c.c. of oil, shaken with 50 c.c. of the solution, 14 c.c. went into solution, or 56 per cent. phenol.

(2) A duplicate experiment gave identical results.

(3) From 150 c.c. of oil shaken with 350 c.c. of soda solution, 84 c.c. went into solution, or 56 per cent.

The alkaline solution of phenol was distilled with water vapor to remove any non-phenol portion of the oil that might have gone into solution. The solution was then acidulated with sulphuric acid and the distillation continued The distilled oily phenol was dried with exsiccated sodium sulphate and exposed to the temperature of a winter's night, when it solidified to a crystalline mass. The melting point of the dried, almost colorless crystals was found to be 50°. With chloroform and caustic soda it gave the characteristic reactions of thymol and carvacrol. The melting point, however, excluded the latter.

Non-Phenol Constituents.—That portion of the oil which was not dissolved by shaking with 10 per cent. soda solution was distilled with water vapor; 79·3 grammes of oily distillate were obtained; this was dried. Inasmuch as the original oil had been shaken only once with caustic soda, the oily distillate still gave a reaction for thymol, when tested according to Flückiger, with chloroform and caustic soda solution. This reaction, however, is very delicate and would indicate traces of phenol. The oil, deprived practically of thymol, had a specific gravity of 0·887. In a 100-mm. tube it turned the plane of polarized light 1·7166° to the right. Upon fractionation, the following fractions were obtained:

	c.c.
78°– 88°	3·5
88°– 98°	1·75
98°–166° (about)	7·0
166°–172°	4·0
172°–178°	13·0
178°–186°	0·5
186°–202°	6·0
202°	—

Fraction 172°–178°.—It was shown by Mr. Brennan, a year ago, that the oil of Monarda fistulosa contained cymene. A large yield of this fraction suggested the possibility of the presence of this hydrocarbon in this closely related oil. In order to ascertain its presence or absence, 7 c.c. of this fraction were tested with a dilute solution of 30 grammes of potassium permanganate until the color disappeared. The solution was then filtered and evaporated to dryness, the residue then dissolved in water and acidulated with sulphuric acid. A dense, whitish precipitate was formed. After recrystallization from alcohol, the melting point was found to be 155° to 156°, which is that of oxycumic acid, thus proving the presence of cymene.

Fraction 186°–202°.—On account of the small amount of this fraction, the combustion only could be made in order to ascertain the probable presence of linalool or a similar body.

(1) 0·1372 gr. of substance gave 0·1340 gr. H_2O = 0·01488 gr. H,
and 0·4145 gr. CO_2 = 0·11304 gr. C.

(2) 0·13089 gr. of substance gave 0·1285 gr. H_2O = 0·01427 gr. H,
and 0·3749 gr. CO_2 = 0·1101 gr. C.

(3) 0·1289 gr. of substance gave 0·1322 gr. H_2O = 0·0149 gr. H,
and 0·3809 gr. CO_2 = 0·10388 gr. C.

	Calculated for $C_{10}H_{18}O$. Per Cent.	Found. I Per Cent.	II. Per Cent.	III. Per Cent.
C	77·92	82·39	78·08	80·6
H	11·69	11·84	11·25	11·6
O	10·37	6·77	10·67	7·8

These results do not agree very well, nor can the fractions after but one fractionation be considered pure. The amount of oxygen, however, makes the presence of some oxygenated substance like linalool probable.

May 31, 1896, about 30 pounds of young plants not yet in blossom were collected near Arena, Wis., by Prof. Cheney. From the partly dried herb about 118 grammes of oil, or 3·39 per cent., were obtained by distillation with water vapor. The oil possessed a slightly reddish color, and had a specific gravity of 0·925 at 20°. The rotatory power could not be taken on account of the dark color of the oil; a volumetric estimation of thymol was made.[5]

(1) *a.* 4·4580 grammes of oil, when diluted to 13·0 c.c. with petroleum ether and shaken with 5 per cent. soda solution until the volume of ether solution remained unchanged, and thymol was no longer indicated by Flückiger's re-agent. Loss of volume 3·0 c.c., equal 61·22 per cent. phenol.

b. Alkaline solution of thymol diluted to 100 c.c. with 5 per cent. soda solution.

(*a*) 10 c.c. of this solution required 73·5 c.c. $\frac{N}{10}$ I solution for precipitation of phenol, hence $75·3 \times 0·0037415 = 61·68$ per cent. thymol.

(*β*) A duplicate test gave identical results.

(2) *a.* 5·7887 grammes diluted to 13·3 c.c. lost 3·9 c.c., hence 61·9 per cent. phenol present.

b. Alkaline solution of thymol diluted to 100 c.c. with 5 per cent. soda solution.

(*a*) 10 c.c. required 95·0 $\frac{N}{10}$ I. v. s. for precipitation of phenol, hence present 61·4 per cent. thymol.

(*β*) A duplicate test gave identical results.

TABLE OF RESULTS.

	Shaking Out Process. Per Cent.	As Thymol Iodide. Per Cent.
Experiment 1	61·22	61·68
" 2	61·9	61·4

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[5] For the details of this process, compare "The Volumetric Estimation of Phenols," by E. Kremers and O. Schreiner.

ALCOHOL AS A SOURCE OF ERROR IN THE TITRATION OF ALKALOIDS AND ALKALOIDAL RESIDUES.[1]

By Chas. Caspari, Jr.

Methods for the volumetric determination of alkaloids in crude drugs and galenical preparations frequently include directions to dissolve the varnish-like residue (after the same has been washed with ether and dried to constant weight) in alcohol, with the aid of heat if necessary, and then to add water until a slight permanent turbidity results. A definite quantity of decinormal acid, sufficient to insure a slight excess, having been added to the mixture, the excess is titrated with centinormal alkali in the presence of a suitable indicator.

In the course of some recent analytical work, the writer observed that alcohol appeared to influence the color produced by acids and alkalies with different indicators in the titration of alkaloidal residues, and a series of experiments were, therefore, made to study more closely the nature of the changes observed, and also to determine, if possible, whether alcohol really was the disturbing factor.

Plain water, diluted alcohol (a mixture of equal volumes of alcohol and water), 94·5 per cent. alcohol (commercially known as cologne spirit) and absolute alcohol, were employed in connection with decinormal sulphuric acid and centinormal potassium hydroxide solution, as also the following well-known indicators; hæmatoxylin, cochineal, Brazil wood, methyl orange or tropæolin OO, lacmoid and litmus. Tap water was found unfit for colorimetric work, as it invariably caused an alkaline reaction with the indicators, even after having been well boiled, and pure distilled water was, therefore, employed instead. 10 c.c. of the respective liquids were put into a beaker, together with the indicator, and acid or alkali added until the desired change of color was produced.

The following results are very significant and well worthy of attention:

Hæmatoxylin solution, 1 gm. to 100 c.c. alcohol. Three drops were used for each experiment.

10 c.c. distilled water; the addition of 1 drop $\frac{N}{100}$ KOH sol. caused a decided purple color.

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[1] Presented at the Montreal meeting of the American Pharmaceutical Association.

10 c.c. diluted alcohol required 0·65 c.c. $\frac{N}{100}$ KOH sol. to produce the same purple color, which was again destroyed upon addition of a few drops of alcohol.

10 c.c. alcohol required 1·25 c.c. $\frac{N}{100}$ KOH sol. to show a decided alkaline reaction.

10 c.c. absolute alcohol; a purple color was produced within one minute by the indicator alone, without the addition of any alkali. The color, however, disappeared upon addition of a trace of decinormal acid.

Cochineal solution, 10 gm. to 100 c.c. 25 per cent. alcohol. Five drops were used for each experiment.

10 c.c. distilled water required 6 drops (about 0·2 c.c.) $\frac{N}{100}$ KOH sol. for a decided alkaline reaction, indicated by a purplish-red (onion-red) color.

10 c.c. diluted alcohol required 0·80 c.c. $\frac{N}{100}$ KOH sol. to produce the same color, which was again destroyed by a few drops of alcohol.

10 c.c. alcohol required 1·4 c.c. $\frac{N}{100}$ KOH sol. to produce the same color.

10 c.c. absolute alcohol required 0·1 c.c. $\frac{N}{100}$ KOH sol. to show the alkaline reaction.

Brazil-wood solution (U. S. P. test solution), 10 gm. to 20 c.c. water, with subsequent addition of 2 c.c. alcohol. Ten drops were used for each experiment.

10 c.c. distilled water required 5 drops $\frac{N}{100}$ KOH sol. to produce the pink color indicating alkalinity.

10 c.c. diluted alcohol required 1·0 c.c. $\frac{N}{100}$ KOH sol. to produce the same color, which was again destroyed by a few drops of alcohol.

10 c.c. alcohol required 1·6 c.c. $\frac{N}{100}$ KOH sol. to show the alkaline reaction.

10 c.c. absolute alcohol required 0·25 c.c. $\frac{N}{100}$ KOH sol. to produce the desired pink color.

Lacmoid solution, 1 gm. to 500 c.c. 50 per cent. alcohol. Ten drops were used for each experiment.

10 c.c. distilled water required 2 drops $\frac{N}{100}$ KOH sol. to produce a decided purplish-blue color.

10 c.c. diluted alcohol required 0·45 c.c. $\frac{N}{100}$ KOH sol. to produce the same color, which was again destroyed by a few drops of alcohol.

10 c.c. alcohol required 0·7 c.c. $\frac{N}{100}$ KOH sol. In this case the purplish-blue color produced was discharged by a large excess of alkali.

10 c.c. absolute alcohol. A decided blue color was produced by the indicator alone, which was not changed by addition of an excess of alkali.

Litmus solution (aqueous solution). Four drops were used for each experiment.

a. 10 c.c. distilled water; a purplish-red color was produced by the indicator alone.

b. 10 c.c. distilled water required 2 drops $\frac{N}{100}$ KOH sol. to produce a decided purplish blue color.

10 c.c. diluted alcohol required 0·2 c.c. $\frac{N}{100}$ KOH sol. to produce the same color as in *a*.

10 c.c. diluted alcohol required 0·65 c.c. $\frac{N}{100}$ KOH sol. to produce the same color as in *b*. The color was again destroyed by addition of a few drops of alcohol.

10 c.c. alcohol required 1·10 c.c. $\frac{N}{100}$ KOH sol. to produce the same color as in *b*.

10 c.c. absolute alcohol produced the same color as obtained in *b* with the indicator alone.

Tropæolin OO or methyl orange solution, 1 gm. to 500 c.c. 50 per cent. alcohol. Two drops were used for each experiment.

a. 10 c.c. distilled water, upon addition of 1 drop $\frac{N}{10}$ H_2SO_4, gave the characteristic pink color, showing an acid reaction.

b. 10 c.c. distilled water, with 0·1 c.c. $\frac{N}{10}$ H_2SO_4, gave a decided crimson color, showing a strong acid reaction.

c. 10 c.c. diluted alcohol required 1·10 c.c. $\frac{N}{10}$ H_2SO_4 to produce the same color as in *b*.

10 c.c. alcohol, with 3·5 c.c. $\frac{N}{10}$ H_2SO_4, failed to produce the same color as in *b*; a deep orange-red color was produced, which gradually, on further addition of 1·25 c.c. $\frac{N}{10}$ H_2SO_4, changed to crimson.

10 c.c. absolute alcohol failed to produce a crimson color with 4 75 c.c. $\frac{N}{10}$ H_2SO_4.

d. 10 c.c. distilled water, treated as under *b*, required 0·97 c.c. $\frac{N}{100}$ KOH sol. to produce a strong yellow color indicating alkalinity.

10 c.c. diluted alcohol, treated as under *c*, required only 10·20 c.c. $\frac{N}{100}$ KOH sol. to produce the same color as in *d*.

From the foregoing reactions it is very evident that alcohol and absolute alcohol, as available in the market, exercise a decided influence on color indicators, and may be the fruitful source of error in volumetric work. Strange to say, while alcohol appears to play the part of an acid toward hæmatoxylin, cochineal, Brazil wood, lacmoid and litmus, by requiring an increased quantity of alkali to produce the characteristic alkaline color reaction, it behaves quite differently towards methyl orange or tropæolin OO. In the latter case alcohol seems to lend to the indicator a strong alkaline reaction, requiring a phenomenal amount of decinormal acid to produce the characteristic acid color. The fact that absolute alcohol appears alkaline towards all of the above indicators is remarkable, and, while no further examination of the article was undertaken, it is but fair

to say that it was the product of a well-known, reliable American manufacturer. The alcohol used was such as is usually sold to pharmacists by the jobber as prime cologne spirit.

If, then, alcohol plays so important a part in color reactions, it is more than likely that its presence will influence more or less the results obtained in the titration of alkaloidal residues, and hence it should be rigidly excluded in all such work if accuracy is desired. It may be employed to bring the impure (often resinous) residue into solution, so that the decinormal acid can dissolve the alkaloid more readily, but should invariably be dissipated by the application of heat before titration of the acid solution is undertaken.

To show the effect of alcohol on the valuation of alkaloids, and to point out more forcibly the necessity for the absence of this solvent in such operations, four alkaloids—morphine, cocaine, atropine and strychnine—all of American manufacture, were assayed volumetrically both in aqueous and dilute alcohol solution. Quinine and cinchonine cannot be determined volumetrically like the other alkaloids above mentioned, because when in acid solution, prepared exactly like the others, both give an alkaline color indication with cochineal and tropæolin; with hæmatoxylin and Brazil wood, although the reaction at first is acid, an alkaline reaction occurs before the excess of acid is neutralized, and hence results entirely too high are obtained.

The solutions used in making the following determinations were so prepared that 100 c.c. of finished product contained 0·500 gramme of alkaloid and 20 c.c. of decinormal acid; 10 c.c. of this solution were used for each titration, centinormal alkali solution being used to determine the excess of acid. The equivalent of 1 c.c. $\frac{N}{100}$ KOH solution in $\frac{N}{10}$ H_2SO_4 was determined for each indicator, so that accurate calculation as to percentage could be made. The proportion of pure alkaloid determined in both the water and the dilute alcohol solutions is given opposite each indicator for the sake of ready comparison, the quantity of indicator used having been the same as stated in the experiments with plain solvents, mentioned above. Two extra determinations were made in the case of each alkaloid, with hæmatoxylin and tropæolin OO, after addition of 5 c.c. alcohol to the dilute alcohol solution; this was done for the purpose of showing the effect of a larger proportion of alcohol, whereby the detrimental influence of the latter liquid is emphasized.

MORPHINE.

Indicator.	Water Solution.	Diluted Alcohol Solution.
	Per Cent.	Per Cent.
Hæmatoxylin	98·58	96·05
Cochineal	98·48	95·26
Brazil wood	98·32	89·68
Tropæolin OO	98·55	105·44
Lacmoid	98·91	97·56
Litmus	98·41	94·05

In the case of tropæolin the diluted alcohol solution required the addition of 1·53 c.c. $\frac{N}{10}$ H_2SO_4 before a decidedly acid color was obtained and satisfactory titration made possible.

After addition of 5 c.c. of alcohol to 10 c.c. of the diluted alcohol solution, the following results were obtained:

	Per Cent.
With hæmatoxylin	89·00
With tropæolin OO, requiring the addition of 3·4 c.c. $\frac{N}{10}$ H_2SO_4,	107·68

COCAINE.

Indicator.	Water Solution.	Diluted Alcohol Solution.
	Per Cent.	Per Cent.
Hæmatoxylin	97·26	94·65
Cochineal	96·35	95·02
Brazil wood	95·95	90·71
Tropæolin OO	97·26	104·23
Lacmoid	97·44	96·53
Litmus	96·35	92·83

In the case of tropæolin the diluted alcohol solution required the addition of 1·56 c.c. $\frac{N}{10}$ H_2SO_4 before a decidedly acid color was obtained and satisfactory titration made possible.

After addition of 5 c.c. of alcohol to 10 c.c. of the diluted alcohol solution, the following results were obtained:

	Per Cent.
With hæmatoxylin	92·84
With tropæolin OO, requiring the addition of 3·2 c.c. $\frac{N}{10}$ H_2SO_4,	106·65

ATROPINE.

Indicator.	Water Solution.	Diluted Alcohol Solution.
	Per Cent.	Per Cent.
Hæmatoxylin	99·89	96·82
Cochineal	100·08	97·33
Brazil wood	99·75	94·62
Tropæolin OO	100·02	105·58
Lacmoid	100·38	97·95
Litmus	98·20	91·49

In the case of tropæolin the diluted alcohol solution required the addition of 1·52 c.c. $\frac{N}{10}$ H_2SO_4 before a decidedly acid color was obtained and satisfactory titration made possible.

After addition of 5 c.c. of alcohol to 10 c.c. of the diluted alcohol solution, the following results were obtained:

	Per Cent.
With hæmatoxylin	92·95
With tropæolin OO, requiring the addition of 3·2 c.c. $\frac{N}{10}$ H_2SO_4,	108·09

STRYCHNINE.

Indicator.	Water Solution.	Diluted Alcohol Solution.
	Per Cent.	Per Cent.
Hæmatoxylin	97·03	94·59
Cochineal	97·43	94·25
Brazil wood	96·53	89·11
Tropæolin OO	97·19	103·54
Lacmoid	98·03	97·19
Litmus	92·11	84·03

In the case of tropæolin the diluted alcohol solution required the addition of 1·5 c.c. $\frac{N}{10}$ H_2SO_4 before a decidedly acid color was obtained and satisfactory titration made possible.

After addition of 5 c.c. of alcohol to 10 c.c. of the diluted alcohol solution, the following results were obtained:

	Per Cent.
With hæmatoxylin	87·64
With tropæolin OO, requiring the addition of 3·3 c.c. $\frac{N}{10}$ H_2SO_4,	110·22

QUININE.

Although quinine, for reasons already stated above, cannot be titrated in the same manner as the other alkaloids mentioned, the effect of alcohol can nevertheless be observed. Decinormal hydrochloric acid was used in place of sulphuric acid to avoid fluorescence, and hæmatoxylin was employed as the indicator.

When titrated in water, the result showed 117·18 per cent.; when titrated in a mixture of alcohol and water (equal volumes), the result showed 112 79 per cent.

It is possible that alkaloids and alkaloidal residues may be titrated with a fair degree of accuracy in alcoholic or hydro-alcoholic solution, provided the relation of the centinormal alkali to the decinormal acid has been previously determined for the particular indicator to be employed, in the presence of the alcohol or the mixture of alcohol and water; but this necessitates extra labor, as well as a knowledge of the proportion of alcohol present, since an increase or decrease of the latter materially affects the equivalent.

The following tables show at a glance the variation in the relation of alkali to acid, as indicated by color reactions, in the presence of different mixtures of alcohol and water. The presence of alcohol, moreover, seems to have a direct influence on the color produced by the indicator, and the changes are by no means as sharp as in water alone, and in some cases are even observed with difficulty, thus rendering the titration results less reliable. The decinormal sulphuric acid used was standardized by precipitation as barium sulphate, and found to contain 0·004889 gramme H_2SO_4 in 1 c.c. With this acid the centinormal alkali solution was standardized, phenolphtalein being used as an indicator.

A. TABLE SHOWING THE NUMBER OF C.C. $\frac{N}{100}$ KOH SOLUTION NECESSARY TO PRODUCE A NEUTRAL OR FAINTLY ALKALINE REACTION WITH DIFFERENT INDICATORS WHEN 10 C.C. $\frac{N}{10}$ H_2SO_4 ARE TITRATED IN THE PRESENCE OF 60 C.C. OF DISTILLED WATER, ALCOHOL, AND MIXTURES OF ALCOHOL AND WATER.

Indicator.	Distilled Water.	Alcohol, 1 Volume. Distilled Water, 2 Volumes.	Alcohol, 1 Volume. Distilled Water, 1 Volume.	Alcohol, 2 Volumes. Distilled Water, 1 Volume.	Alcohol, 94·5 Per Cent.
Phenolphtalein . . .	100·16	104·39	106·72	106·76	109·24
Hæmatoxylin . . .	98·17	100·54	100 83	101·53	103·15
Tropæolin OO . . .	98·42	96 93	96·11	94·70	74·65[1]
Cochineal	98·52	101·20	101·79	102·96	104·07
Brazil wood	98·57	102·09	103·10	104·28	106·28
Lacmoid	99·06	100·44	101·13	101·50	102·71
Litmus	98 66	102·69	103·40	104·93	106·32

[1] Color very difficult to distinguish.

B. TABLE SHOWING THE EQUIVALENT OF 1 C.C. $\frac{N}{100}$ KOH IN DECINORMAL SULPHURIC ACID WHEN TITRATED WITH DIFFERENT INDICATORS IN THE PRESENCE OF DISTILLED WATER, ALCOHOL, AND MIXTURES OF ALCOHOL AND WATER.

Indicator.	Distilled Water.	Alcohol, 1 Volume. Distilled Water, 2 Volumes.	Alcohol, 1 Volume. Distilled Water, 1 Volume.	Alcohol, 2 Volumes. Distilled Water, 1 Volume.	Alcohol, 94·5 Per Cent.
	C.c.	C.c.	C.c.	C.c.	C.c.
Phenolphtalein . . .	0·09984	0·09579	0·09414	0·09367	0·09154
Hæmatoxylin . . .	0·10186	0·09946	0·09917	0·09849	0·09694
Tropæolin OO . . .	0·10160	0·10316	0·10405	0·10559	0·13396
Cochineal	0·10150	0·09881	0·09824	0·09712	0·09609
Brazil wood	0·10144	0·09795	0·09699	0·09589	0·09409
Lacmoid	0·10094	0·09956	0·09887	0·09842	0·09736
Litmus	0·10135	0·09738	0·09671	0·09530	0·09405

The only explanation that can be offered for this peculiar behavior of alcohol is on the basis of Arrhenius' theory of electrolytic dissociation, as detailed in the writings of Professor Ostwald. According to the latter authority, indicators also depend for their value entirely upon dissociation, and although the various alcohols have a dissociating effect upon salts held in solution by them, it is less marked than in the case of water, and decreases with the increasing molecular weight of the alcohol.

The conclusions forced upon us as a result of the observations above enumerated are, that far more accurate volumetric determinations of alkaloids and alkaloidal residues can be made in water alone than in mixtures of the same with alcohol, and that the error caused by the latter is augmented as the proportion of alcohol is increased.

BALTIMORE, MD., July, 1896.

GELATINE CAPSULES.[1]

BY WM. C. ALPERS.

I. HISTORY OF THE CAPSULE.

During the last fifty years, the filled and empty gelatine capsules have become of such general use among physicians and pharmacists that a short history of their origin and development may not be without interest. Our Pharmacopœia ignores them entirely, and the various handbooks on pharmacy contain but very scant information on this useful article.

In compiling the following notes, the writer consulted the libraries, public and private, of New York, as far as they were accessible; and while he thinks that he has recorded all that is desirable to know on this subject, he cannot claim that nothing has been overlooked or forgotten, and will be glad to receive additions or corrections. He is greatly indebted for much valuable information to the firms of H. Planten & Co. and E. Fougera & Co., of New York; to Parke, Davis & Co. and the Merz Capsule Company, of Detroit, Mich., and to the authors of the various pharmaceutical manuals.

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[1] Presented at the Montreal Meeting of the American Pharmaceutical Association.

The gelatine capsule was invented by Mr. A. Mothes, a French pharmacist, in 1833. Experiments had evidently been made before, but no evidence of success nor public acknowledgment can be found before this date. Official notice of the discovery was taken by two reports to the "Académie royale de Médecine," one on May 13, 1834, the other on February 28, 1837, both of which speak approvingly of it. On March 15, 1837, Dr. M. F. Ratier, a prominent physician and teacher of Paris, inserted in the *Dictionaire de Médecine et de Chirurgie practiques* (Vol. XV, page 285) an article on "Thérebinthine de Copahu," in which he speaks of the happy idea of the gelatine capsules, which admit of direct administration of either balsam of copaiva or its volatile oil without any addition liable to alter its virtues. There is, therefore, no doubt that this invention was at once welcomed by the medical and pharmaceutical professions as a safe method of administering nauseating liquids. The capsules were known after their inventor, as "Capsules Gelatineuses de Mothes," and were manufactured and sold by the firm of Mothes et Dublanc, of Paris. At first, only capsules filled with balsam of copaiva were made; afterwards various nauseating liquids, principally oils, were treated in the same way. Soon a demand for empty capsules arose, and the firm supplied them also. The method of making these capsules was described by Mr. Cottereau, in an article in the *Traité de Pharmacologie*, early in 1835. A small pouch, made of a soft skin, shaped like a small olive, served as a mould. This pouch was fastened by means of a wax thread to a small long-necked funnel of metal, the upper wide opening of which could be closed with a screw cover. Through this funnel the pouch was filled with mercury in order to expand it. A solution of gelatine and water was made in the proportion of 1 part of gelatine to 3 of water, and the expanded pouch dipped into it. On withdrawing, a rotary motion was given the instrument until the gelatine had almost hardened; if desired, a second or third dipping might be used. The cover of the funnel was removed and the mercury poured out, by which the pouch would collapse and could easily be withdrawn. The neck of the capsule was then cut, leaving a small opening, through which it was filled by means of a syringe. Finally, a drop of the gelatine solution would close the capsule.

In 1838, Mr. Garot, a pharmacist of Paris, read a paper before the

Pharmaceutical Society of Paris (*Journal de Pharmacie*, 1838, p. 78), in which he states that the manufacturers of capsules having refused to sell empty ones, he was forced to invent a plan of his own, in order to fill certain prescriptions of local physicians who did not wish to have the formula communicated to others. He proceeded by making a mass of the cubebs and copaiva and other substances, and divided and rolled the mass into pills. He then made a gelatine solution, using 1 part of gelatine to 3 of water, put the pills on needles, dipped them into the liquid, rotated them in the air until the gelatine was losing its liquid consistency, and kept them on the needle by inserting the blunt end into a thick paste. After preparing about fifty pills, he would take each needle and warm it gently at a candle, the heat being sufficient to melt the gelatine around the needle to allow the latter to be withdrawn. A warm spatula and a trace of liquid gelatine would finally close the hole left by the needle. It will be seen that this is substantially the method used in later years by the manufacturers of gelatine-coated pills, although other methods are now employed by some. Mr. Garot, therefore, was the inventor of the gelatine-coated pill, in 1838. Two years later (*Journal de Pharmacie*, 1840, p. 585), Mr. Vée proposed an improvement in the coating material by using one part of gelatine, seven parts of jujube, and water enough to dissolve both to a syrupy consistency. This mass would prevent the cracking of the coating caused by the rapid drying and contraction of the gelatine, and also leave a pleasant flavor in the mouth after swallowing the pill. Another modification was recommended in 1848 by Mr. M. G. Jozeau (*Gazette Médicale de Paris*, 1848, III, 193), by substituting casein for gelatine.

Returning to the capsules, it must be noted that the process invented and employed by Mr. A. Mothes was a rather complicated one, and we cannot wonder that ingenious minds looked for improvements. Such an improvement is recorded in the *Journal de Pharmacie et de Chimie* (Vol. 1846, p. 354), by Mr. A. Giraud. He took small, iron, olive-shaped balls with a wire attached to one end, and, after covering them with a thin coat of sweet almond oil, dipped them into a solution of syrupy consistence, of 24 parts of gelatine, 4 parts of syrup of acacia, 6 parts of simple syrup, and 20 parts of water. The coated moulds were suspended by means of the wire, until the gelatine was cold enough to be touched by the fingers,

when he would grasp each one with the hand and briskly withdraw the mould. The gelatine mass was elastic enough to expand and contract again. Mr. Giraud finally asked whether there would be legal objections to using this method. The answer is given in a foot note, stating that this process cannot be used, as it interferes with the patent of Mr. Mothes. It seems, however, that Mr. Mothes himself took advantage of this paper, for, in 1850, that is, four years later, we find in the *Journal de Pharmacie et Chimie* (Vol. 1850, p. 204), a communication signed H. B., to the effect that "Mr. Mothes has introduced an improvement in making his capsules, in order to overcome the variations in size, by taking iron moulds of the shape of an olive suspended by wires." Then follows the same description that Mr. Giraud had given before, without giving him the credit of the invention. We must surmise that French manufacturers, just like their American brethren, are in the habit of re-inventing, whenever the original inventor is careless enough to publish his invention without patenting it at once. From this time the gelatine capsules were generally used by the French pharmacists and physicians, and we find many evidences in the various French pharmaceutical journals. Formulas for certain mixtures are recommended, ending generally with the phrase: "Then fill into gelatine capsules, and close them in the usual way." It might be mentioned that in 1878 (*Journal de Pharmacie et de Chimie*, 1878, II, p. 74), Mr. Detenhof gives again a description of a method of making capsules, which differs from Giraud's method only in the material. Detenhof used 7·4 gelatine, 14·4 water, and added 14·4 glycerin; he was probably the first one to recommend glycerin in the gelatine mass.

The French Pharmacopœia also took notice of this invention, and we find an official formula for the manufacture of the gelatine capsule in the edition of 1866 of the "Codex Medicamentarius." The mass employed consisted of gelatine, 30 parts; gum arabic, 30 parts; sugar, 30 parts; white honey, 10 parts, and water, 100 parts. The process differs from that of Giraud, in so far that the olive-shaped iron moulds are not provided with a wire, but are soldered with their elongated necks to a small plate, so that after dipping them into the gelatine solution they would stand erect until sufficiently dry to withdraw them from the mould. The last edition of the German Pharmacopœia also recognizes the capsules, and gives a similar formula. Also in other countries the capsules soon became

very popular, and experiments to improve the method of their manufacture were made by many pharmacists.

In the *Repertorium für die Pharmacie* (1840, XXIV, 2, p. 158), we find an article on "The Formation of the Gelatine Capsule," by Adolph Steege, court apothecary at Bucharest. He provided his moulds with wooden handles fitting snugly into perforations of a wooden plate. Putting about fifty such moulds into position, he dips them into the gelatine solution and then rotates the whole apparatus in the air until the gelatine has become solid enough to be handled. Taking each handle from the plate, he cuts the gelatine neck at the proper place, and pulls the capsule off the mould. This process is substantially still in use to-day, according to "Remington's Pharmacy," third edition, p. 1231, where the apparatus used by Parke, Davis & Co. is illustrated and described.

In 1845, two French pharmacists, Evans and Lescher, invented a process by which a small animal membrane, made of the small intestines of the sheep, was used as a covering. A description of their invention is given in the *Pharmaceutical Journal and Transactions*, 1845–46, p. 361; but as it was only short-lived, a repetition seems unnecessary.

It must not be forgotten that the capsules so far mentioned were, without exception, olive-shaped, and had to be closed with a drop of gelatine solution. They were hand-made and naturally expensive. The French manufacturers exported them to all countries, but it seems that they preferred to sell filled capsules of various formulas, and while the pharmacists of other countries handled them, the capsules did not become of general use. To us the question—how they were introduced into American Pharmacy—is of particular interest.

The first mention of gelatine capsules appears in the AMERICAN JOURNAL OF PHARMACY, of 1835, New Series, Vol. I, p. 351, giving a short translation of Cottereau's article in the *Traité de Pharmacologie*, without any commentary. Only two years later we find in the same journal (AM. JOUR. PHARM., 1837, New Series, Vol. III, p. 20), a lengthy article on "Capsules of Gelatine," by Alfred Guillou, graduate of the Philadelphia College of Pharmacy, which is well worth copying:

Provide a suitable number of narrow tin dishes, about 18 or 20 inches in length, ½ inch deep, and about 2 inches in width. In the length of these and

in a line, plant or solder at a distance of 1 inch from each other a number of smoothly formed metallic knobs of an ovoid shape, whose apex having been somewhat lengthened out, forms a thin neck by which they are attached to the tin dishes. This neck may be about ½ of an inch in length. Procure a sheet of tin and perforate with round holes, of which the diameter will be equal to the thickness of the knobs. Having greased the knobs well with lard, so as not only to prevent any adhesion to them, but also the adhesion of the inner sides of the capsules to each other after casting, pour melted glue (the most transparent having been selected) upon them, and allow it to become tolerably stiff. If you think the shell is too thin, a second coat may be poured upon the first. The capsule having been coated, this cast is allowed to cool down to the ordinary consistency of India rubber, and having run a knife around the neck, you twist it briskly around and pull it upwards off the knob. It will immediately collapse and lose the form imparted to it on the mould, but if laid aside to dry, will, by the time it has hardened, have regained the desired rotundity. Place it upon your perforated plate or "filler," and you can thus conveniently fill it with the article prescribed, and close the opening with a piece of gold-beater's skin.

It will be noticed that Mr. Guillou used glue instead of gelatine, and also recommended iron moulds soldered by their necks to small tin plates, and therefore devised the instrument which is now official in the French Pharmacopœia. As this article was written in 1837, that is, nine years before Mr. Giraud recommended his iron mould with wires, there is no doubt that Guillou, an American student of the Philadelphia College of Pharmacy, was the first inventor of the improved process for making capsules, preceding even Steege's invention by five years. I have not been able to discover whether any practical results came from this discovery; the records of the Patent Office do not mention any patent for capsules at that time, nor have I found the inventor's name anywhere later.

The real capsule industry in America dates from 1836, when Mr. H. Planten emigrated from Paris and established a capsule business at No. 3 Chambers Street, New York, at the place where the East River Savings Institution is now located. Filled capsules, according to French formulas, were manufactured after the process of Mothes, and new ones added whenever a demand arose. The capsules were first sold as "Mothes' capsules" and the labels printed in French and English. Powders were also put in the capsules, if ordered. Capsules in two parts were also made, the lower part filled and then capped. But their manufacture was soon abandoned as unpractical, the two parts rarely fitting well. The firm of H. Planten, now H. Planten & Son, never patented any machinery and invariably declined

to announce their methods. How long they adhered to Mothes' original process, or when improvements were made is, therefore, impossible to say. The old firm of B. Keith & Co. also attempted to introduce empty gelatine capsules and manufactured them here about 1860, but soon abandoned the attempt. E. Fougera & Co., of New York, also imported French capsules for many years, but during the last twenty years the domestic capsules, on account of their cheapness, superseded those imported.

In 1863, the firm of H. Planten took up the industry of empty capsules for powders and liquids. The first capsules intended for powders alone were called by them jujube paste capsules and were offered to the trade before 1870. Another manufacturer, Dundas Dick, also experimented in the same direction and secured a patent on cone-shaped capsules as early as 1865. The first inventor, however, to manufacture capsules, as now used, by machinery, to devise ingenious apparatus for their production on an extensive scale, and to render their use popular in pharmacy, was Mr. F. A. Hubel, of Detroit. He secured his first patent for a capsule machine February 13th, 1877, although he had already manufactured and sold empty capsules as early as January, 1875. (See Parke, Davis & Co. price-list of 1875.) From this date till 1883, we find a long list of patents in the records of the Patent Office, some of them granted to Mr. Hubel, some to other inventors. Disputes as to priority soon arose, and lawsuits followed, in which Mr. Hubel was victorious. His whole output is brought into the market by Parke, Davis & Co. The following is the process employed by him, which I copy *verbatim* from a letter that Parke, Davis & Co. had the kindness of sending me in answer to my inquiry:

"Metal moulds set in metal plates are first lubricated and then dipped into solution of gelatine. They are withdrawn at a regulated speed, the solution being of a given temperature, and that temperature being higher according as the temperature of the moulds is lower and *vice versa*. The temperature of the moulds and of the solution, and the speed at which the moulds are withdrawn, determine the thickness of the capsule. The solution comprises 7 parts of water to 4 of gelatine. After dipping, the gelatine investment is allowed to congeal sufficiently and it is then cut by a special cutting machine, and the waste about the cut is shoved away from the capsule. The capsules are dried by passing a current of

air over them, and when dry and hard are stripped from the mould by machine. The caps are joined to the bodies by hand, and at the same time defective capsules are sorted out and rejected. The finest quality of gelatine is alone suitable. The one other process we are familiar with varies from the foregoing only in the fact that after dipping the moulds, the capsules are allowed to dry wholly, or almost wholly, before stripping."

I also quote from a letter of "The Merz Capsule Company," of Detroit, who write: "In order to make capsules properly and sufficiently cheap, it requires a large amount of complicated and expensive machinery and constant attention to small details, inasmuch as the $\frac{1}{1000}$ of an inch difference, more or less, in the thickness of a capsule will either make it a loose-joining or a tight-joining capsule."

The last invention on the field of capsules is that of Mr. Heineman, who now manufactures empty elastic capsules for fluids.

"By means of these the druggist is enabled himself to fill elastic capsules as occasion may require, perfectly and without loss of time, doing the work as well as the capsule manufacturer himself could do the same in the factory. The convenient shells will keep almost indefinitely, are always ready for use, and enable the druggist not alone to avoid carrying a large stock of filled capsules, but enable him to dispense freshly-made capsules containing an almost indefinite variety of formulas with whatever variations physicians may be pleased to give them from time to time, as the needs of the patient may require."

The use of the gelatine capsule is daily extending, not only in medicinal and pharmaceutical adaptation, but also for mechanical purposes of varied kinds. They are employed for beef-juices and other extracts, for candies and chocolates, for inks and bluing. The latest use to which they are put is for packing cigars, in order to better preserve the flavor, and daily new ideas appear in which the gelatine capsule may take part in due time.

2. FILLING THE CAPSULE WITH POWDERS OR PILL MASS.

There exists a great diversity of opinions as to the proper way of dispensing medicinal media in gelatine capsules. While some pharmacists claim that a mass should always be prepared, others contend that the only proper way is to fill the mixture of the various

items of the prescription in powder form into the capsule. Under certain circumstances both may be right. Physicians are not always explicit in writing prescriptions, and often omit to state in what form they wish the medicine administered. If they would simply add "fiat *massa* in capsulas dividenda," or "fiant *pulveres* in capsulas dividendi," all doubts would be dispelled. But there are only a few who do this, and as long as the *modus operandi* is left to the judgment of the pharmacist, a definite rule should be adopted.

The public in general prefer capsules filled with *powder*, and all pharmacists know the sometimes very troublesome customer who will insist on having his 20 grains of quinine put into ten capsules, because "they act better that way." The argument that a dry powder is more readily dissolved or absorbed than a more or less compressed pill, is a very plausible one and hard to refute. In reviewing prescriptions on which capsules are ordered, we will find that the majority, almost 65 per cent., are orders for pills, that is to say, they contain ingredients whose mixture will result in a pill mass. Vegetable extracts of more or less soft consistency, oils of various natures, articles like oxgall or ichthyol, and similar drugs, all these can only be prepared in pill form; for to make powders of them would require an addition of so much absorbing powder, as to make the powders unreasonably large. To this class we must also count those prescriptions that contain delinquescent salts or such chemicals which by their mixture will turn moist or liquid. There can be no question about such prescriptions and our investigation is, therefore, restricted to prescriptions, that are composed only of dry ingredients, or in which the amount of liquid medicaments, like a few drops of some ethereal oil, is so small that it will be readily taken up by the solid ingredients without the addition of any absorbing powder. What is ordered in such cases, powders or pills?

Let us take analogous cases. Would a pharmacist think of changing a prescription for pills into one for powders, or one for powders into a liquid? Is it not the rule to dispense conscientiously whatever is ordered, and not alter a prescription in the least, unless the limits of safety have been transgressed? Why then should a mixture of drugs ordered in powder form be changed into a pill mass? A capsule is, according to all authorities, a cover for nauseating or strong-smelling medicines; no teacher or encyclopædist restricts its

meaning to pills alone. A pharmacist, therefore, has no right to suppose that a physician wishes to order a pill mass when he orders powders, especially as the prescriber has it in his power to add the words "fiat massa," and thereby express such desire if it existed. Where, however, such a remark is wanting, there is no reason why a mass should be formed. *Powders*, not *pills*, are ordered to be put into capsules, and the pharmacist who changes the powders into a mass doubtlessly transgresses the limits of his professional liberties. And what other motive to do so can there exist but the desire to save time and labor? The tendency of late years to prepare prescriptions at lower prices than all the competitors, and sacrifice everything to cheapness, has reduced not only the time allotted to each prescription, but also the care and solicitude so necessary in the fulfilment of our professional duties. It goes quicker to make a mass and cut into so many parts than to carefully weigh each powder, and let the accuracy with which the last powder balances the calculated weight serve as a proof of the correctness of all powders.

It is claimed that in many instances the bulk of the dry powder would necessitate a very large capsule, while a mass could be compressed to a much smaller volume. In answer to this argument we must not forget that it is not the pharmacist's province to regulate the bulk of the medicine, or to correct a physician, as long as the dose is within the limits of safety. If a physician chooses to order a mixture containing as a dose $\frac{1}{60}$ grain of strychnine dissolved in a tablespoonful of some aromatic liquid, no pharmacist would consider it his duty to change the tablespoon to a teaspoon, and thereby reduce the bulk of this medicine to one-fourth of the prescription under the plea that the bulk of the dose was too large. If, therefore, the physician orders a powder to be put into capsules and the largest capsules alone will hold the prescribed dose, there is no reason why the pharmacist should change the order. Nor is it always true that a mass will reduce the bulk. In the first place, it is always necessary to add some excipient, if it be only water, thereby adding to the weight; very often adhesive vehicles, as gum acacia, tragacanth, various mucilages or glycerites are needed to form the mass. The danger of adding a little too much of a liquid vehicle, and then being compelled to correct the mistake by adding some solid, often increases considerably the bulk of the mass with-

out adding to its medicinal properties. Furthermore, while all these ingredients may be perfectly harmless, if considered by themselves, they may yet change the finely comminuted powder to a hard lump, which, instead of being easily assimilated by the patient, would pass undissolved through the system or even be the cause of serious digestive disorders. Lastly, we may also state that although there are people who prefer small capsules to large ones, there are just as many who will take a large capsule as readily as a small one.

A few words may be added about the filling of capsules, which seems to be a difficult task to some pharmacists. Whenever a mass is first prepared, little difficulty is experienced. The general procedure is to roll the mass and cut it into the required number of pieces, in such a way that each piece has the shape of a small cylinder, of a diameter a little smaller than that of the body of the selected capsule. The operator should then wash his hands, in order to remove all traces of the mass, and then introduce the small cylinders into the capsules by means of a needle with which he picks them up. As especially fit for this work, I mention the small botanical needles used in dissecting flowers, which are provided with a wooden handle, an instrument that every pharmacist can prepare himself. The covers are afterwards put on with the fingers. By this method, the odor as well as the taste of the ingredients of the mass are thoroughly covered by the capsule. Care should be taken not to select too large a capsule, so that the mass after drying will fill only half the space; but even with the greatest care in preparing the mass a shrinking will afterwards take place, an inconvenience which it seems impossible to overcome.

During the last year, I have given this method of filling capsules my special attention, and compared repeatedly the cylindrical parts of the mass by weighing them. In very rare instances have I found two parts that weighed exactly the same, the variation in my own work ranging from a fraction of 1 per cent. to 3 per cent., in spite of the greatest care exercised. Experiments with masses cut by other operators showed a similar, sometimes worse, result. I have discovered two apparently equal pieces of the same mass to vary as much as 8 per cent. In most instances this lack of exactness seems to be irrelevant, but we must admit that if we once allow a variation it is hard to draw a limit. I have therefore adopted a better and more correct method, and during the last six months instructed my

assistants to weigh the mass, divide the weight by the number of capsules ordered, and then weigh each part separately before putting it into the capsule. Objection might be raised that this is a troublesome and tedious procedure; but this is not so. By using the metric weight a division is quickly made, and the weighing of from 12 to 20 small parts requires no longer time than the rolling and cutting.

To introduce powders into the capsules is not quite so simple, and requires a small apparatus to insure correct results. Some pharmacists resort to the rather crude method to put the powder, without dividing it, on a piece of paper, take the body of the empty capsule between the fingers in the left hand and the cover in the right, and fill both by shoving them through the powder repeatedly. This method, which is even recommended in one of the newer works on pharmacy as the best means of filling capsules, is objectionable in more than one respect. In the first place, it is impossible to gauge the quantity of the powder that is thus introduced into the capsule, and repeated weighing of each capsule becomes necessary, until the correct weight is reached, sometimes after many trials. Secondly, the very object of the capsule is entirely ignored; particles of the mass will adhere to the outside, and neither taste nor odor of nauseating medicines can afterwards be entirely removed. A capsule filled with quinine in this manner will taste bitter no matter how often it is wiped after filling, and if the mass should contain such strong-smelling ingredients as asafetida or valerian, their odor can never be removed. The proper way, insuring correctness and elegance, is to weigh each powder separately, and introduce it into the empty capsule by means of a small apparatus, of which various kinds are in the market. There is Reymond's capsule filler, consisting of a block of wood with a number of sockets for the empty capsule, and a second block with a corresponding number of funnel-shaped receptacles. Another instrument, the Davenport capsule filler, consists of a metal funnel for the capsule and a plunger. Both these and other apparatus have their advantages and drawbacks.

I have here an instrument which I think is an improvement on the others. It consists of a base (*Fig. 2*), with a number of small plugs, and a block (*Fig. 1*), with a corresponding number of holes into which the plugs fit; these holes are widened at the upper side into small funnels. At the sides are pegs as guides for the upper

block, so that each hole will be exactly over each plug. In the centre of the baseboard there is a small metal rod with a thread for a screw-nut at the upper end; the nut for this thread is held on the upper side of the perforated block by an overlapping flange, and can be turned easily by means of a pair of wings. A short plunger

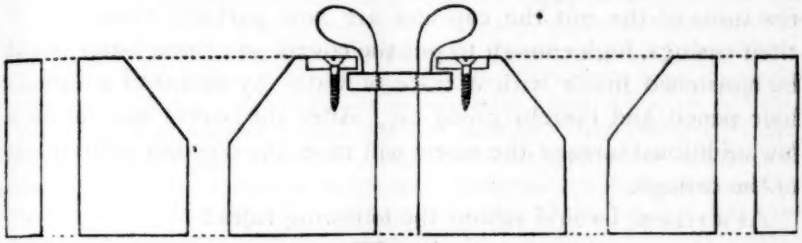

Fig 1

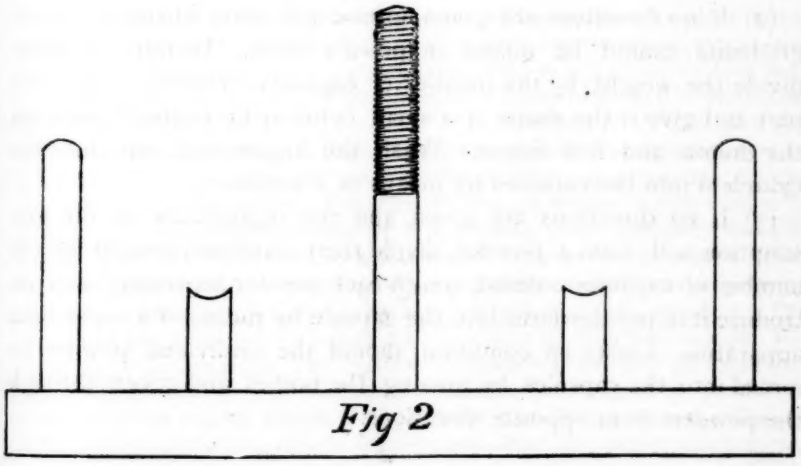

Fig 2

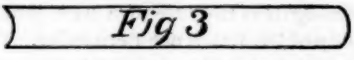

Fig 3

(*Fig. 3*), concave at one end and convex at the other, completes the apparatus.

The *modus operandi* explains itself. The two blocks are arranged so as to place the upper one over the lower one; the empty capsules are introduced and pushed by means of the plunger into the per-

foration until they touch the plugs; if necessary, the upper block is lowered by means of the screw until the upper parts of the capsules are even with the funnel-shaped widening of the perforations; the powders, each one having been weighed, are put into the funnels and pressed down with the concave end of the plunger, leaving a small elevation over each capsule for the hollow of the cover. By a few turns of the nut the capsules are now partially raised out of their casings, high enough to put the covers on; these latter might be moistened inside with a trace of water by means of a camel's hair pencil, and thereby glued on. After the covers are put on, a few additional turns of the screw will raise the capsules entirely out of the casings.

As a *résumé* I would submit the following rules:

(1) Always follow the physician's directions as to the formation of a mass.

(2) If no directions are given, form a pill mass whenever the ingredients cannot be mixed in powder form. Weigh the mass, divide the weight by the number of capsules ordered, weigh each part and give it the shape of a small cylinder by rolling it between the thumb and first finger. Wash the fingers and introduce the cylinders into the capsules by means of a needle.

(3) If no directions are given, and the ingredients of the prescription will form a powder, divide their combined weight by the number of capsules ordered, weigh each powder separately, and introduce it in powder-form into the capsule by means of a convenient apparatus. Under no condition should the undivided powder be forced into the capsules by moving the bodies and covers through the powders from opposite directions.

The Indian Pharmacologist is the title of a new journal established at Calcutta, under the editorship of Dr. Lawrence Fernandez. The first number, issued July 1st, contains articles by David Hooper on "A Pharmacopœia for India;" on "The Value of Quinine," by Sir William Moore; and on "Formulæ for Disguising Flavors," by R. W. Gardiner.

Mr. Joseph Ince, lecturer on pharmacy in the Pharmaceutical Society of Great Britain, has resigned. Mr. Ince has been associated with the Society, in one way or another, since a very early period in its history. In addition to his literary work in connection with the *Pharmaceutical Journal*, he served as member of the Society's Council for a number of years.

EDITORIAL.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The members of the American Pharmaceutical Association assembled at Montreal this year under the most favorable conditions for a successful meeting, except the one temporary drawback of high temperature; this, however, had practically disappeared before the first session convened, and, therefore, did no more harm than to keep a few members at home. All the sessions were well attended, notwithstanding the fact that there was an absence of the tension which prevailed at the two preceding meetings, in the shape of alcohol legislation and college requirements. In regard to the former it may be said that those in favor of tax-free alcohol evidently consider it hopeless to try to get any concessions from Congress, if a majority of the members of this Association are opposed to a removal of the tax. Concerning college requirements, the members have evidently come to a realization of the fact that they have no jurisdiction over the colleges. The best the Association can do is to make recommendations, which was done mildly this year in some of the papers presented to the Section on Education and Legislation.

In the general sessions, business was conducted promptly and without much friction. Some of the reports of committees were unnecessarily lengthy, but before they ran the gauntlet in the general meeting or one of the sections they were sufficiently trimmed to prevent them from doing harm, and in most cases they did or will do good.

The Section on Commercial Interests was the source of some uneasiness to the members in general, and, prompted by the feelings of anxiety for the reputation of the Association, they attended the one session of this Section in a body. Chairman Seabury, however, "is nothing if not original," and this year he had a surprise in store in the shape of answers to the queries which had been propounded to members. These queries he embodied in his address, with the answers thereto, which he had received from five members. The answers he had tabulated, so that in one short hour the combined address and papers were disposed of. The Chairman apparently satisfied the members present by his statement, backed by one from the Secretary of the Section, in reference to the journal known as the *Mortar and Pestle*, whose publication by the officers of the Commercial Section, soon after the Denver meeting, was a surprise to most members of the Association, but which came to an untimely end after the issue of four numbers. The Chairman, however, declared his intention to continue the publication. Nevertheless, the Association was quick to disclaim any responsibility, and a motion was carried to expunge all reference to the publication from the minutes, and to direct that the name of the Association should not be used in connection therewith.

The Section on Scientific Papers was the most successful one at the meeting. Its proceedings were delayed considerably by the report of the Committee on Pharmacopœia, which had been referred to it by the General Session. This report, when it left the Scientific Section, was so clipped as not to be recognizable. The members of the Association are not yet ready to make themselves ridiculous in the eyes of the Committee of Revision of the U. S. P., by suggesting sweeping changes; for example, the substitution of artificially pre-

pared oils for the natural ones—a question, by the way, which would require years of research work before it could be intelligently answered.

The papers presented to this Section were not as numerous as in some previous years, and while no one of them was entitled to be considered of a high order of merit, still the average was good, and probably this tended to insure the large attendance and the full discussion at the meetings of this Section. The Committee on Research produced as much in the way of results as could reasonably be expected of it in one short year, and it will probably become a very valuable part of this Section.

Much credit is due Professor Prescott for the able manner in which he has pushed this work.

The Section on Education and Legislation had less than a dozen papers presented to it, many of which were devoted to discussing the duties of State Boards of Pharmacy. Professor Beal, in his report as Secretary, made the rather sweeping assertion that a State is as well off without as with a State Board of Pharmacy, unless the latter has the sympathy and support of a State Pharmaceutical Association. Taken as a whole, the meeting was an eminently successful one, and the entertainment provided by the Canadians contributed in no small degree to this end.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

LES ALCALOIDES DES QUINQUINAS. Par E. Léger, avec une préface de M. E. Jungfleisch. Paris: Société d'Éditions Scientifiques. 1896. Pp. 278.

The literature of the alkaloids has become so extensive, that an author who takes up a group of them and gives the subject the comprehensive treatment which Mr. Léger has in this volume deserves the gratitude of all those who have to do with the study of plant principles.

The first chapter treats of the cinchona barks, their origin, history, chemical composition, and classifies the alkaloids derived from them. Chapter II considers the group of the alkaloids in general. In Chapters III to XIII, inclusive, each alkaloid is taken up and considered separately, and its composition, identification and separation detailed.

The last chapter is devoted to the chemical constitution of the alkaloids of the group.

In treating of this part of the subject the author limits himself to a consideration of quinine, quinidine, cinchonine and cinchonidine, and he makes out that much has been done towards establishing the chemical constitution of these compounds.

Finally, the value of the book is very much enhanced by some thirty pages of a bibliographical index. We regret very much that in compiling this the author has limited himself to the French and German literature of the subject. Only such English references as have been abstracted into journals in those languages has found a place, and all titles have been translated into the French language.

Notwithstanding this drawback in its bibliography, the work as a whole is a most valuable one, and we should be glad to see it translated into the English language in order that its circulation might be extended as far as possible.

LES FERMENTS SOLUBLES (Diastases—Enzymes). Par Émile Bourquelot. Paris: Société d'Éditions Scientifiques, 1896. Pp. 220.

Chapter I is devoted to the definition and classification of the soluble ferments. The remaining chapters take up the various ferments which have been classified, and consider their origin, preparation, composition, action and the results of the action of physical and chemical agents. A final chapter discusses the theories of fermentation.

Each chapter in the book is followed by a list of references, which, as a whole, make a valuable bibliography of the subject. Many of the ferments considered are of immediate interest to pharmacists, for example, diastase, maltase, pepsin, papain, etc., and the whole book forms a complete monograph on the ferments that will well repay one for the reading.

ANNUAL REPORT OF THE CLERK OF FORESTRY, for the Province of Ontario. By Thomas Southworth, Clerk. Toronto, Ont., 1896.

The whole of this pamphlet of 132 pages is of interest to foresters, agriculturists and the general reader. The sections which are especially attractive to the pharmacist are "The Uses for Forest Products," "Trees as Industrial Resources" and "Gall Insects Infesting Canadian Oaks." Forestry in Canada, as in the United States, is attracting the attention of many economic students, and the desirability of intelligent treatment of the subject is as important for the well-being of that country as it is for our own.

CONTRIBUTIONS OF THE U. S. NATIONAL HERBARIUM. Vol. III, No. 9. U. S. Department of Agriculture, Division of Botany.

This number comprises the following contributions:

I. Flora of Southwestern Kansas. Report on a collection of plants made by C. H. Thompson in 1893. By A. S. Hitchcock.

II. Crepis Occidentalis and Its Allies. By Frederick V. Coville.

III. Plants from the Big Horn Mountains of Wyoming. By J. N. Rose.

IV. Leibergia, A New Genus of Umbelliferæ from the Columbia River Region. By John M. Coulter and J. N. Rose.

V. Roseanthus, a New Genus of Cuburbitaceæ from Acapulco, Mexico. By Alfred Cogniaux.

In the first of these papers 193 species of plants, representing 42 natural orders, and in the third 84 species, are catalogued. The second, fourth and fifth papers are illustrated.

CATALOGUE OF THE UNIVERSITY OF WISCONSIN FOR 1895-96. Madison, Wis., 1896.

ANNUAL ANNOUNCEMENT FOR 1896-97, DEPARTMENT OF PHARMACY, SCIO COLLEGE, Scio, O.

TWENTY-FIFTH ANNUAL CIRCULAR OF THE NATIONAL COLLEGE OF PHARMACY. Washington, D. C., 1896.

CHICAGO COLLEGE OF PHARMACY. THE SCHOOL OF PHARMACY OF THE UNIVERSITY OF ILLINOIS. Thirty-seventh Announcement, 1896-97.

PROSPECTUS OF THE COLLEGE OF PHARMACY OF THE CITY OF NEW YORK, 1896-97.

BRITISH PHARMACEUTICAL CONFERENCE.

The thirty-third annual meeting of the British Pharmaceutical Conference was held at Liverpool, England, July 27 to 30, 1896. For the following information we are indebted to the *Pharmaceutical Journal* and the *Chemist and Druggist*, in their issues of August 1st.

The sessions of the Conference proper were begun with the customary address of welcome on the part of the city authorities, after which the President, William Martindale, delivered his address.

Mr. Martindale's work in connection with the "Extra Pharmacopœia," and his numerous official services, as well as his long and active interest in the development of both the sciences of medicine and pharmacy, were factors which went far to fix, in the minds of his hearers, the belief that the questions demanding attention would receive at his hands careful and able consideration. Nor in this were they disappointed.

The President reviewed the history of pharmacy back to a time shortly prior to the Liverpool meeting, twenty-six years ago, and, in giving reminiscences of the papers read at that meeting, it was curious that the adulteration of beeswax with paraffin was attracting the attention of pharmacists then as now. In speaking of the advances made in this period, he said:

"We may take the year 1868 as the commencement of a new epoch—the beginning of a great physiological and chemical awakening in regard to the uses of chemicals as medicinal agents. It was also memorable by the passing of our Pharmacy Act, and the inauguration of a system of compulsory examination and registration. . . . But, adhering to our date, 1868, let me draw your attention to the important medical agents that are now largely used, which were then either not in existence or were mere chemical curiosities

"I have already mentioned amyl nitrite and the nitrites. Chloral hydrate was first exhibited at our Exeter meeting, in 18 9, by Daniel Hanbury, and by the following year had created a great sensation. Its homologue, butyl-chloral hydrate, has also since been largely used. Boric acid was but a chemical rarity previous to 1875; it is now produced in tons for medicinal use, as well as for the purpose of preserving milk and foods. Regarding the desirability of the latter use of it there may be difference of opinion, but there can be little doubt of its utility and value in hot climates, although it is being superseded by a new competitor in the field—formic aldehyde."

After referring to a number of antiseptics introduced within this period, the speaker mentioned the active principles of drugs, the synthetic alkaloids and the synthetic coal-tar products which have come extensively into use in ophthalmic surgery, local anæsthesia, and as hypnotics.

In calculating the cost to the purchaser, the President maintained that the qualifications of those engaged in dispensing drugs and medicines should be taken into consideration, and his own words may be used to illustrate this opinion.

"The pharmacist, therefore, as a chemist, must be worthy of this name, and it is now legally held that in all cases the individual seller of a poison must be a qualified and registered person. The pharmacist has the responsibility of selling poisonous, as well as other medicines, and his care and attention, both in storing and selling them, need to be continually exercised. Not only so, but he must be a judge of the quality, as well as chemically able to test his wares, of which the public, in most cases, can be no judges. Hence, his remuneration is not for material supplied, but for special service rendered, and is, therefore, in many cases, out of proportion to the actual commercial value of his commodities. This applies to the simple sale of drugs, though the argument is much stronger when applied to the compounding of medicines. The special training, therefore, of the individual seller or compounder must necessarily enhance the cost of medicines to the public, who are safeguarded by such training."

The progress of elegant pharmacy was then dwelt upon at some length by the speaker.

"Pharmacy being the handmaid of medicine, it is our duty to aid the medical practitioner and to be in touch with his requirements wherever our assistance may be of service to him.

The application of the pharmacist's art can and should in numerous ways help him much more than is the case at present, although great advances have been made in this respect within the period I have been considering."

The President deplored in a somewhat radical manner the lack of a knowledge of pharmacology on the part of medical men, but placed the blame with the conjoint board of the Royal Colleges of Physicians and Surgeons of London.

"For their examination there is now no stipulated time required to be devoted to the subjects of pharmacy and materia medica, or even to chemistry. All that is necessary is that the students' schedules are signed. There is no examination at all in practical dispensing, and now there is no separate examination in pharmacology, which may be defined as the knowledge of the physiological and therapeutic action of drugs, or the action of medicinal agents on the body in health and disease, so that a student may pass his qualifying examination, in which this subject—pharmacology—only forms a section of Part I (Medicine), knowing comparatively little or nothing of it. . . . This new departure is certainly casting discredit on the use of medicine as a factor in the healing art. 'In five or six years hence,' a medical writer has said, 'we shall have growing up around us men, who from sheer timidity, will rarely venture to prescribe anything but the simplest remedies,' and 'the unfortunate qualified practitioner,' after devoting 'the best years of his life to the acquirement of much useless knowledge . . . ignorant of the means of alleviating the sufferings of his patients, will, in despair, fall back on the preparations of the advertising chemist.'"

The speaker concluded his address after mention of the subject of the organic serums, lymphs and animal extracts in connection with the future of pharmacy, by referring in an eulogistic manner to the labors of Pasteur, Darwin and Huxley on biology, and indirectly on medicine, surgery and pharmacy.

The President's address occupied thirty-three minutes, after which followed the reception of delegates, the reports of the Executive Committee, Treasurer and Formulary Committee.

The preliminary exercises having been concluded, the next in order was the reading of original communications.

The first was on

THE PHARMACY OF CONIUM MACULATUM.

By E. H. Farr and R. Wright.

The authors gave quite an extensive *résumé* of the history of conium, the reputation of which as a remedial agent seems to have been in a state of fluctuation from ancient times to the present, when it is again falling into disrepute among medical men, due chiefly to the fact that most of the pharmaceutical preparations of the drug are practically inert. The statement was made that up to the year 1887 no work had been done on the pharmaceutical side of the subject at all commensurate with that accomplished on the medical side. In that year the method of Cripps for determining gravimetrically the value of conium, which consists in the isolation of the alkaloids and their conversion into hydrochlorates, was devised, and was subsequently adopted by the authors in their investigations of the drug and its preparations. It was with the object of adding to the more definite knowledge of conium from the pharmaceutical standpoint that the work described in the paper was undertaken. Specimens of the hemlock plant were selected at different stages of its growth, and the alkaloidal value of the different parts determined. The results were as given in the following table, which shows the percentages of alkaloidal hydrochlorates:

Stage of Development.	Source.	Roots.	Stems and Stalks.	Leaves.	Flowers with Peduncles.	Green Fruits.
Young plants, 4 to 6 inches high	Uckfield.	·047	·017	·031		
Plants, 4 feet high, taken before flowering	Hitchin.	·022	·019	·120		
Plants, 3 feet to 3 feet 6 inches high, showing incipient inflorescence	Uckfield.	(*a*) Cortex. ·031 (*b*) Axis. ·032	·037	·090		
Plants, 5 feet high, in full flower	(*a*) Uckfield.	·050	·064	·187	·236	
	(*b*) Ashford. Derbyshire.	·018	·012	·075	·086	(1) ·725 (2) ·975

The average loss of weight on drying was: Roots, 77 per cent.; stems and stalks, 86 per cent.; leaves, 79 per cent.; flowers, 80 per cent., and fruits, 68 per cent.

Samples of fresh green fruit yielded the following percentages of alkaloidal hydrochlorates:

Year.	1.	2.	3.
1892	·935	·975	—
1893	·896	1·049	1·088
1896	725	·975	—

These results were thought to confirm those of previous investigators. The authors suggested that in a future Pharmacopœia the green fruit only shall be retained. They also recommended the introduction of a fluid extract of the fruit from which the other preparations may be made. Reference was made to the fact that in the United States Pharmacopœia all preparations of conium, except the extract and fluid extract made from the fruit, have been discarded.

JAPANESE FENNEL AND ITS OIL.

By John C. Umney.

Japanese fennel, as stated by the author, was quite different in appearance from the fennel fruits from Southern Europe and India, and, upon casual observation, had the appearance of anise, but, upon closer examination, was found to be distinctly different. On distillation the fruits yielded 2·7 per cent. of a pale yellowish oil, having a specific gravity of ·9754 at 15° C., and an optical rotation of 15·5 in a 100-mm. tube. It solidified at — 7° C. when stirred, and became liquid again at — 10° C. About 75 per cent. of anethol was determined to be present in the oil, in addition to fenchone and terpines. The oil from Japanese fennel, therefore, appeared to differ but little from normal oils from other fruits, and corresponded well with the requirements of the U. S. Pharmacopœia.

RADIOGRAPHY.

By Leo Atkinson.

In this communication the author gave a brief sketch of the rise and uses of X-ray photography, and observed that the variability in transmission of X-rays by different bodies is not a more pronounced phenomenon than the well-known diathermic properties of many bodies. He claimed that the knowledge of chemistry and physics possessed by the pharmacist makes him specially qualified to undertake the practice of radiography, and referred to some of the discoveries made by this means, stating that many sophistications of foods and drugs can be detected by its aid.

NOTE ON THE STRENGTH OF SOME OF THE SUCCI.

By E. H. Farr and R. Wright.

The authors' attention was drawn to this class of preparations by an experience with a stock sample of succus conii, which, upon examination, was found to be practically valueless. Five samples (in two cases six) of the following succi were examined: Belladonnæ, conii, hyoscyami and scoparii. The results indicated that the average strength of succus belladonnæ is almost twice as great as that of the tincture, while that of succus conii and succus hyoscyami is, in each case, much below the average of the corresponding tincture.

NOTE ON CONCENTRATED HYDROBROMIC ACID.

By Charles T. Tyrer.

It was stated that an examination of this acid for sulphur compounds was attended with negative results. The conclusion was reached that a specific gravity of 1·250 should be the highest degree of concentration for the official acid.

NOTE ON HYPOPHOSPHOROUS ACID.

By Charles T. Tyrer.

The author commented on several of the processes for the preparation of this acid, but was of the opinion that the acid made by the careful decomposition of barium hypophosphite by dilute sulphuric acid is the best. It was found not to deposit on long standing, and when of a specific gravity of 1·137 contained 30 per cent. of pure hypophosphorous acid.

A SAFETY PIPETTE.

By E. W. Lucas.

This instrument consisted of an ordinary pipette, with a somewhat elongated mouthpiece, with two constrictions about an inch apart. The upper constriction was ground smooth inside, the lower one was imperfect, while between the two was a loosely-working glass plug. The pipette was operated in the usual way, and when the liquid reached the plug this was forced into the second constriction which it fit accurately, thus preventing the farther rise of the liquid.

CASCARILLIN.

By W. A. H. Naylor and R. D. Littlefield.

The work of the authors was two-fold—to determine the true character of the cascarillin obtained by Allessandri with the use of oxalic acid, and to see how far this body and the cascarillin of Duval corresponded in composition to the formula of C. and E. Mylius. The product obtained by Allessandri's process

lost 50 per cent. on purification. The remaining portion was identical in melting-point and behavior toward reagents with the principle obtained according to Duval's method. A combustion of the pure cascarillin gave the formula $C_{16}H_{24}O_5$. It melted at 203·5° C. C. and E. Mylius assigned to the principle obtained by them the formula $C_{12}H_{18}O_4$, and a melting-point of 205° C. The fact that the substance isolated by the authors yielded a distillate allied to anthracene ($C_{14}H_{10}$) when heated with zinc dust was considered an indication that their formula is nearer the truth. The process of Allessandri, which has been recommended as a commercial one, was, therefore, regarded as untrustworthy.

BELLADONNA ROOT POWDER; SEPARATED SIFTINGS COMPARED.

By R. H. Parker.

A sample of belladonna root was lightly ground and separated into "fine," "medium" and "coarse" powders, by means of sieves, 60, 40 and 20 meshes to the inch. After examination of these portions separately the results showed that the fine powder gave a darker-colored tincture, but contained less alkaloid; and that the removal of the finer portion of belladonna root powder, to the extent of 40 per cent., made the remainder of about 30 per cent. increased alkaloidal potency.

TABLET-MAKING AT THE DISPENSING COUNTER.

By S. Hardwick.

This paper was full of practical information, and the author showed how, with very simple apparatus, tablets of a great variety of medicaments can be skilfully dispensed.

THE EFFECTS OF CLIMATE AND SOIL ON OILS OF PEPPERMINT.

By John C. Umney.

In a previous investigation the author found that the principal difference between black and white Mitcham (England) oils was in the proportion of esters of menthol present, the latter having the higher percentage of these constituents. Moreover, the white had a greater optical activity and gave a deeper blue color with acetic and nitric acids. An authentic sample of oil distilled in the United States from white peppermint was not obtained, but samples from black Mitcham plants were found to vary somewhat, the oil from Wayne County, N. Y., having a higher ester percentage than that yielded by Michigan plants. The results further showed that the black Mitcham plant when grown in the United States yields an oil closely resembling the white. It was considered unlikely that the higher percentage of Wayne County, as compared with other American oils, was due solely to superior methods of distillation. The oil from Japanese peppermint did not appear to be much affected by conditions of climate and soil, that distilled in England and the United States being very similar to the native product.

ON WHITE WINE VINEGAR.

By Alfred H. Allen.

The results of analyses of the genuine article were given. It was also stated that genuine wine vinegar always contains a notable quantity of potassium bitartrate, which is not present in vinegar from other sources. Analysis showed

that dilute acetic acid was supplied in fourteen cases where white wine vinegar was called for.

CONDENSED MILK.

By Alfred H. Allen.

The commercial brands were divided into three classes, those made by concentrating milk to one-third of its original volume and usually adding a preservative, those treated with cane sugar—about 40 per cent.—after concentration, and those treated in a special manner with a view to approximate human milk. Complete analytical data regarding various brands led to the conclusion that much of the sweetened milk is unfit for ordinary purposes unless largely diluted, when it becomes much weaker than pure milk. The author also condemned the statement often made on labels that for infants' use the preparation should be diluted with from 6 to 14 parts of water, as the observation of such directions could not fail to lead to serious results.

NOTES ON POTASSA SULPHURATA.—COTTONSEED OIL.—THE PRONUNCIATION OF PHARMACOGNOSY.

By W. Elborne.

The author showed that the green and dark green varieties of sulphurated potash were prepared from the lower grades of commercial carbonate of potash, and when dissolved in water afford a dark, turbid solution; sample prepared from purer carbonates (90 per cent. K_2CO_3) yielded a product of a dull yellow or greenish-yellow color, freely soluble in water without turbidity. The latter was suggested as an addition to the Pharmacopœia, and, furthermore, that its solubility in rectified spirit might be restored to 75 per cent.

Cottonseed oil was condemned as a substitute for olive oil in ointments, liniments and like preparations, on the authority of a therapeutist who had found it to produce irritant effects.

The opinion was expressed that pharmacognosy should be pronounced with the "g" silent, and the accent on either the first or second "o."

FORMALDEHYDE AS AN ANTISEPTIC.

By F. C. J. Bird.

The statement that formaldehyde may be added to certain liquids as a preservative and subsequently driven off by the application of heat was proven to be erroneous. The author found, after a number of experiments, that aqueous liquids retained this substance with the greatest pertinacity, and that it was almost impossible to remove the last traces. Infusions appeared to keep better when a tuft of cotton moistened with the antiseptic was suspended in the bottle, than when it was added direct to the contents. The former method was thought to have the further advantage of less formaldehyde being retained. The author saw no objection to its use as a preservative when employed in this manner.

NOTES ON PYROXYLON B. P.

By Charles T. Tyrer.

It was found that most of the formulæ given in text-books for making pyroxylon were either unreliable or were wanting in precision. These objections were sought to be overcome by experiments described in detail in the paper. The U. S. P. formula yielded a better product than the B. P. process.

The practice of keeping pyroxylon in water was considered objectionable, as decomposition is thus brought about.

INDIAN BAEL AND ITS PREPARATIONS.

By A. C. Abraham.

The pulp was regarded as the active portion of the fruit, and clinical experiments to support this claim were brought forth. Some portions of the B. P. process for making the fluid extract were somewhat obscure, but were elucidated by the author with the result that a more satisfactory preparation was obtained. The recognition of bael fruit, by the British alone, of European Pharmacopœias, indicated the indifference with which it was regarded.

LIQUOR AURI ET ARSENII BROMATUS.

By R. Wright.

The following formula was submitted as speedy and reliable:

Arsenious acid (in powder)	40 grains.
Potassium carbonate	40 "
Bromine	100 "
Gold (in leaf)	13·5 "
Distilled water, sufficient for	1 pint.

Boil the arsenious acid and potassium carbonate with 4 ounces of distilled water until solution is complete. Add 12 ounces of distilled water to the gold-leaf placed in a wide-mouthed bottle, then run in the bromine and shake until the latter is dissolved. Add the first solution and shake for a few seconds. Transfer to a flask and boil until bromine fumes cease to be given off. Allow to cool; add distilled water to make 1 pint and filter.

ESSENCE OF RENNET.

By J. A. Forret.

The speed with which the author's method can be carried out was the principal point in its favor. Three or four calves' stomachs, preserved in the dry condition, were macerated for one hour in 50 ounces of a 10 per cent. solution of salt, repeating this operation twice. To the strained liquids ½ per cent. of boric acid and 10 per cent. of alcohol were added, filtration being facilitated by the addition of about an ounce of kaolin.

THE EFFECT OF SOLVENTS ON THE ANALYTICAL CHARACTERS OF GINGER.

By J. F. Liverseege.

The author instituted a series of experiments for determining the character of the commercial article, but concluded that probably the simplest way of detecting sophistication with spirit of ginger was to determine the cold water and methylated spirit extracts.

CHINESE OPIUM.

By Frank Browne.

In a previous paper the author communicated some notes on the smoking value of Chinese opium. On further observation he came to the conclusion that, as regards narcotizing power, the extracts of Chinese opium are inferior to the opium of India, although the former contain large quantities of morphine.

THE COMPOSITION OF DIPHTHERIA ANTITOXIN SERUM.

By Gordon Sharp.

The proteid bodies isolated were of the same character as those in normal serum. No alkaloids or characteristic crystals could be detected, and all efforts to obtain a ferment yielded only negative results. Albuminose was present, but was more abundant in samples which had been kept for some time.

The reading of papers and the discussions having been brought to a close, after occupying four sessions, the question of next year's meeting was brought up, and an invitation to hold the Conference in Glasgow in 1897 was accepted.

The following officers were then elected for the ensuing year:

President, C. Symes; Vice-Presidents, Walter Hills, J. Laidlaw Ewing, W. F. Wells and R. McAdam; Treasurer, John Moss; Honorary General Secretaries, W. A. H. Naylor and F. Ransom; Honorary Local Secretary, J. A. Russell; Executive Committee, F. C. J. Bird, George Coull, E. H. Farr, John Foster, Prof. Greenish, T. H. Wardleworth, Edmund White, J. C. Umney and R. Wright.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The forty-fourth annual meeting of the American Pharmaceutical Association convened in Montreal, Canada, on Wednesday, August 12, 1896. The Windsor Hotel was the headquarters of the Association, and, in the ordinary of that building, at 3.45 P.M. on the day mentioned, President J. M. Good called the meeting to order in

FIRST GENERAL SESSION.

He then introduced Mr. R. W. Williams, President of the Pharmaceutical Association of the Province of Quebec, and, afterwards, Mr. W. H. Chapman, President of the Montreal College of Pharmacy. Both of these gentlemen welcomed the members of the Association to the metropolis of the Dominion in very friendly words.

The Chair then asked Prof. E. L. Patch to reply to the remarks of the previous speakers, which he did in an amusing and interesting address. After First Vice-President C. E. Dohme had been called to the chair, the President read his address. Among other things in the course of his remarks, he said:

Probably the most important special committee working during the past year was the one appointed on weights and measures, with instructions to co-operate with the American Metrological Society and other societies in petitioning Congress to pass a law making the use of the metric system compulsory at an early date, in all transactions where weights or measures or both are used. That they almost succeeded is a fact probably well known to all of you. That they did not succeed absolutely is no cause for discouragement. The wonder is that they did so well, when we reflect what it means to a nation to change a system of weights and measures—a system which is absolutely without system, but which, by education and use, has become a part of ourselves. All classes are affected. Fully a generation of people have grown from childhood to maturity in America since the active agitation of this subject began. It must be persistently pressed by scientific organizations, and more thoroughly taught in all our schools, before the people will be ready to accept it in measuring values in the daily transactions of life. Every family has the weights used in the vicinity and recognized by the custom of the place. To change all this at once is to affect the well-being of every man, woman and child in the community. Those opposed to the change in England are much gratified at having so able an ally as Herbert Spencer. One does not like to see so

great a man as he on the wrong side of any question. When he proposes to change our arithmetic, adopt a duodecimal notation in place of the one now in use, and construct an entirely new system of weights and measures to correspond, he is not likely to have much of a following. Tried for his offence by a jury of his peers, he is quite certain to be condemned. He has been ably answered by one of our members. We trust that it cannot long be said, reproachfully, that Great Britain and the United States are the only two influential nations which have not adopted the metric system of weights and measures.

The speaker expressed himself as pleased, also, with the work which the Committee on the Status of Pharmacists in the Army and Navy of the United States had done. He hoped the naval apothecary would finally be granted at least the same rank and pay as the surgeon-major. An event of importance in the work of the Association, this year, is the issuing of a new edition of the National Formulary. The first edition was a popular work, and the second is an improvement on that.

Continuing, the speaker said: Considering the suggestions embodied in the report of the delegates to the Section on Materia Medica and Pharmacy of the American Medical Association, it would undoubtedly be desirable to have introduced into the Pharmacopœia a table of average doses of remedies. This would make the book more popular with druggists, as well as among the physicians. There are difficulties in the way of preparing such a table for a work that is authoritative and likely to be used as such in cases of prosecution. A physician might hesitate to administer an apparently excessive dose of any remedy, even though the exigencies of the case seemed to demand it, if it were possible to use such an authority against him. Furthermore, when doctors disagree, who shall say what is an average dose of any particular drug. It is thought possible, if a carefully worded text accompany the table, that these objections will lose their force, and the expression "average dose" has the merit of being a more elastic one than "maximum dose." I should be in favor, therefore, of a resolution by this Association, requesting the introduction into the next Pharmacopœia of a table of average doses of official drugs and their preparations.

As to the second proposition—to admit certain of the "new remedies" into the Pharmacopœia—it seems to me to deny official recognition to any medicinal agent which is protected by proprietary rights, is indisputably the correct ethical position. Any of that character which are now so honored, and "which cannot be produced otherwise than under a patented process," should be dismissed. The physician is not by such action deprived of their use as remedial agents. Notwithstanding the fact that many of these synthetic compounds possess positive therapeutic value, and skill and knowledge have been exercised in their production, until our patent and trade-mark laws can be so changed as to protect the public against extortion, they should continue to bear the "stigma of illegitimacy." Probably many of the claims which have been set up under the trade-mark and copyright laws would be found to be fictitious if properly contested. Certainly a law which will allow a person to register the name of a drug as a trade-mark, and thereby secure the monopoly of a medicinal substance for all time, is fundamentally wrong.

The speaker thought that were those matters represented to Congress in the proper manner the laws would be modified in the near future, although, no doubt, any effort in that direction would be stubbornly opposed. The alcohol question was still an open one. In place of the resolution passed at the annual meeting in 1894, he would submit the following modification:

Resolved, That it is the sense of this Association that the payment of the rebate of the internal revenue tax on alcohol should be confined to alcohol used in the manufacture of chemicals, alkaloids, ethers, chloral, chloroform, and such other medicinal or industrial products as those in which the alcohol used will lose, absolutely, its chemical and physical properties.

Mention was made of the International Exposition at Prague, which was opened on August 15th, and that the Association would be represented there by Dr. F. Hoffmann, who is now in Europe. The President proposed that greetings be sent the gathering by the Association.

The speaker having concluded, Vice-President Dohme asked the pleasure of the meeting regarding the address. It was voted to receive it and refer it to a committee of three, to be appointed by the chair. Messrs. Diehl, Butler and Simpson were made this Committee. Secretary Charles Caspari, Jr., then called for the reports of the various standing and special committees.

The selection of the nominating committee to elect the officers for the ensuing year was the next business in order, and to afford the members from the various States and Provinces an opportunity to choose their representatives, the President granted a recess of five minutes. The meeting was subsequently called to order, and the Permanent Secretary asked to call the roll of States, Territories, District of Columbia and Provinces of Canada. Responses were had from Arkansas, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, District of Columbia, and the Provinces of Ontario, Quebec and Nova Scotia. In addition to those representing the States and other sections, the President appointed at large Messrs. Ebert, Remington, Gray, Betzler and Voss as members of the Nominating Committee. The committee decided to meet immediately after the adjournment of the session.

Secretary of Council Kennedy followed with the minutes of that body, which had held its first session at 10 o'clock A.M. The minutes were adopted. Mr. Kennedy also reported at this session the names of sixty-two applicants for membership. They were mainly from the eastern and northeastern sections of the United States, although several were from Canada.

The Permanent Secretary was ordered to subscribe for foreign and domestic journals for the use of the Reporter on the Progress of Pharmacy. The reports of the Committee on Membership, of the Auditing Committee, and of the Treasurer for the past year were then listened to.

Professor Whelpley proposed that the Publication Committee on National Formulary allow text-books and periodicals to publish the National Formulary. This proposition was referred to that committee.

A Committee on Time and Place of next Meeting, consisting of Messrs. Alpers, Sheppard, Frost, Fennel and Burge, was appointed by President Good. The committee met after the adjournment of the Nominating Committee. Invitations from Nashville, Tenn., and Lake Minnetonka, Minn., were referred to it. Vice-President Dohme invited the Association to Baltimore, Md., in 1898. Some proposed amendments to the Constitution and By-laws offered at the meeting last year were adopted. Among these was the change of the name of *Permanent* Secretary to that of *General* Secretary. Inquiry was made by Professor Hallberg as to the matter of the International Pharmaceutical Congress organized at the meeting in Chicago in 1893. Professor Whelpley offered an amendment to limit the reading of papers to ten minutes, or in case of a long paper, it must be accompanied by a synopsis, which should not take more than ten minutes. It was referred to Council. Some greetings of personal character and invitations were extended by members present on behalf of friends. Secretary Caspari then made some announcements regarding transportation, and at 6.30 P.M. the session adjourned until 10 A.M. on the following morning. On Wednesday evening, at 9 o'clock, the members of the Association were tendered a reception by the Pharmaceutical Association of the Province of Quebec and the Montreal College of Pharmacy, in the parlors of the Windsor Hotel. The guests were received by the Presidents of these organizations, Messrs. R. W. Williams and W. H. Chapman, respectively. The events of the evening were much enjoyed by all in attendance.

SECOND GENERAL SESSION.

The session began business at 10.40 A.M., Thursday, August 13th, with President Good in the chair. Secretary Caspari read the minutes of the first general session. They were approved. Secretary Whelpley, of the Nominating Committee, reported the following as the choice of the committee for the officers of the Association for the ensuing year: President, J. E. Morrison, Montreal, Can.; First Vice-President, G. F. Payne, Atlanta, Ga.; Second Vice-President, W. A. Frost, St. Paul, Minn.; Third Vice-President, G. W. Parisen, Perth Amboy, N. J.; Treasurer, S. A. D. Sheppard, Boston, Mass.; General Secretary, Chas. Caspari, Jr., Baltimore, Md.; Reporter on Progress of Pharmacy, C. Lewis Diehl, Louisville, Ky.; Members of Council, for three years, C. E. Dohme, J. M. Good and J. P. Remington. It was moved that the nominee for President be balloted for. Messrs. Stevens and Hereth were appointed tellers. Mr. Morrison was unanimously elected. The General Secretary was then asked to cast an affirmative ballot for the other nominees. Minutes of Council were then read by Secretary Kennedy. They were approved. The applicants whose names had been read on the previous day were then invited to complete their membership by paying the annual dues and signing the Constitution. The Committee on Time and Place of next Meeting submitted two reports, one in favor of each place from which invitations had been received. The majority had decided on Lake Minnetonka, Minn., but Mr. J. O. Burge, who represented the minority, endeavored to have the Association consider Nashville, Tenn. Mr. Burge finally lost his motion, and as it had been decided to vote separately on the matters of place and time, an opportunity to discuss the merits of the seasons and days of the week was afforded the members. It was finally agreed that Monday, August 23, 1897, should be the date. The Treasurer then read his report, which Vice-President Dohme moved to receive, as it had been examined by the Auditing Committee. The same disposition was made of the General Secretary's financial accounts. The Reporter on the Progress of Pharmacy, Prof. C. Lewis Diehl, read the introductory to his report, which will occupy about 500 pages of the volume of Proceedings. The report was accepted. Secretary of Committee on Membership Kennedy then reported for the past year. The members who were elected at Denver last year represented thirty-seven States. Only one man became a life member during the fiscal year. Many members were in arrears, and 209 of these who had been delinquent for three or four years were likely to be dropped from the roll. There were 95 life members on the roll at the time of the report. The honorary membership was the same as last year, there having been one death and one member added. The resignations of 25 members had been received. Eighty-three had been dropped from roll for various causes. Death had claimed 19 members. The contributing members numbered 1,448, while the total membership aggregated 1,558. Mr. Kennedy said that, in submitting his twenty-second annual report, he desired to express his thanks to all the officers and members of the Association who so promptly responded when their assistance was required. The report was received and referred to the Publication Committee.

Mr. Ebert proposed a change in the Constitution, making it necessary for the annual fee of $5 for the current year to accompany the application for member-

ship. He was of the opinion that the Association had followed the "drag-net" policy long enough. Chairman C. E. Dohme, of the Finance Committee, reported for that body that expenses had increased during the past year, and that the income had not come up to expectations. Prof. Hallberg moved to receive and publish the report; also, in a second motion, to cheapen the Proceedings. These matters were referred to the Publication Committee.

The reports of the Committees on Publication and Investments were received, adopted and ordered to be published. The report of the Committee on the Revision of the Pharmacopœia was read by title and referred to the Scientific Section for consideration and discussion. Secretary Caspari then read the report of the Committee on General Prizes for papers presented at the last meeting in Denver. The first prize was awarded to Edward Kremers for his paper "On the Chemical Composition of the Volatile Oil from Monarda fistulosa; the second to Edson S. Bastin, for his contribution on "The Structure of Our Cherry Barks;" and the third to Mr. A. R. L. Dohme for his several papers on "Aconitine and Assays of Ergot, Pilocarpus, Coca Leaves and Ipecac Stems." The report was adopted. The Committee on Ebert Prize did not find any of the papers presented at the last meeting to meet the requirements, although they recognized the good quality of many of those submitted. Prof. Hallberg suggested the establishment of a beneficiary fund, and moved that a committee of three be appointed to consider the feasibility of adopting such measures. The motion was carried. The session then took a recess until 3 P.M., when President Good called it to order again. Secretary Caspari read the report of the delegates to the American Medical Association. The report was accepted, and as that body desired the American Pharmaceutical Association to continue to send delegates it was so ordered by the latter. It was moved that a committee be appointed to take up the suggestion of Prof. Rusby, for the consideration of joint investigation by the sections of materia medica, therapy and pharmacy of the two associations referred to above. It was amended to refer this suggestion to the Scientific Section for action. The amended motion was carried.

Chairman Whelpley read the report of the Special Auxiliary Committee on Membership. Mr. Ebert moved to receive it and thank the committee for their work, also to continue the committee and to thank the pharmaceutical press for their aid to the committee. The Committee on National Legislation, created in Denver at the last meeting, submitted a report through its chairman, F. E. Stewart, which document contained an exhaustive dissertation on the present patent and trade-mark laws of the United States, and concluded with the following recommendation:

"Your Committee would, therefore, suggest that a memorial be drawn up, stating the reasons why pharmacy should be afforded relief from the trade competition which threatens its very existence as a profession, and embodying our complaint in relation to the misconstruction of copyright and trade-mark laws, which are seriously injuring the science and practice of pharmacy, and sending the same to the United States Congress, to every pharmacal and medical society, to the American Public Health Association, and the National Bar Association. Then let us keep close watch of the courts, and throw our aid and influence on the side of the right in every case where the pharmacist is in the toils of the law—not to support infringements of patents, copyrights or

trade-marks, or imitations of labels and packages, but to insist that he shall have the unrestricted privilege of making and selling any unpatented pharmaceutical, and of dealing in it under the name by which it is known to the public, in just the same manner as those in the iron business have a right to make and sell iron, or those who manufacture silk or cotton fabric may do so under their proper names.

"We do not wish, however, to advocate a policy by which different things shall be put on the market under the same names. On the contrary, we would insist that the same things under the same names shall be free to all pharmacists to make and sell so long as they are careful not to infringe the just rights of others."

It was moved and carried to receive the report and refer it for publication; also to continue the committee. Secretary Caspari then announced that he had received credentials from four Alumni Associations, twenty-two colleges of pharmacy, thirty-eight State and local associations, representing almost every section of the United States. The report was received and the delegates invited to take the privilege of the floor. Professor Whelpley offered a change in the by-laws, which would direct the General Secretary instead of the President to read the roll of States for the information of nominators of officers. The session then adjourned until 10 A.M. on Friday.

SECTION ON COMMERCIAL INTERESTS.

Immediately after the adjournment of the second general session, Chairman Geo. J. Seabury, of the Section on Commercial Interests, called that body to order. He then read a letter from the Secretary of the Section, Clay W. Holmes, in which that gentleman stated that, on account of sickness, he would be unable to attend. Mr. J. O. Burge, whom Mr. Holmes had succeeded as Secretary, and who was absent from the Denver meeting for the same reason, was chosen Secretary *pro tem.* The reading of the minutes of the Denver meeting of the Section was dispensed with by vote. Chairman Seabury then read the replies he had received from five persons to the queries which he had sent in printed form to the members of the Association, and which were intended to form topics for papers to be read before the Section. His view of the alcohol question was the same as last year, when he recommended free alcohol for use in the manufacture of products to be exported. He recommended that a committee on professional relations between pharmacists and physicians be appointed. The suggestion was made, he said, for the benefit of the National Committee on Trade Interests.

The address was received and referred to a committee, who were to consider the recommendation.

Messrs. Mennen, Simpson, Thompson, Hallberg and Ryan were appointed by the Chairman as a committee to nominate the officers of the Section for the ensuing year. The Chair then declared a recess of five minutes, in order that the committee just created might transact its business. Mr. T. F. Main was chosen Chairman, but he asked to be excused. The following were afterwards nominated: Chairman, Lewis C. Hopp, Cleveland, O.; Secretary, J. E. D'Avignon, Windsor, Ontario; Associates, Messrs. Mennen, Patton and Dewoody. It was moved and carried that these gentlemen be elected, the meeting ordering the Secretary to cast an affirmative ballot. Mr. Seabury then

called for the reports of the Special Conference Committees and the National Committee on Trade Interests, both of which were appointed last year at the annual meeting, but their chairmen were absent and no reports were received. Secretary Burge read resolutions recommending organization of pharmacists. Mr. E. A. Robinson read a paper in reply to Chairman Seabury's query :

"Are non-secret preparations, in imitation of well-known domestic medicines, legitimate products ; and is it honest for a dealer to allow his name to be printed on the label so as to give an unknown compound currency, when he is ignorant of the contents of such preparation? Why does he not prepare his own family and household remedies ?"

The paper was received and referred to the Publication Committee, but no further comment was elicited. Secretary Burge then read a communication from Secretary Holmes, in which the latter said a publication, entitled *The Mortar and Pestle*, had been undertaken by the officers of the Commercial Section, with a view of organizing the pharmacists for their mutual benefit. Four numbers were stated to have been issued ; the first issue was said to have been mailed to every druggist in every town having four druggists, or in all 20,000 copies. The subsequent issues were each in succession of a lesser number of copies, and the territory of their distribution narrowed until only the New England States and some of the largest cities of the Middle and Central States were supplied. A fifth number was about to be issued when the editor was taken sick. It was said to have been difficult to get sufficient matter for the publication, on which account its appearance had been irregular. Many of the members said they had never seen the paper. Others had received a number at each issue. Some had subscribed for it at $1 per year. The Editor, Clay W. Holmes, stated in his communication to the Section that he stood ready to refund all subscriptions pro rata to those who were dissatisfied. The total expense of the publication was $709. Subscription receipts to the extent of $212 had been received. The appropriation of $200 made last year, by the Association, was spent in the effort to organize the pharmacists of the country for their mutual benefit by this means. Chairman Seabury defrayed the remainder of the expense. This gentleman stated that *The Mortar and Pestle* will be continued, and that hereafter all members will receive it. Mr. Alpers moved that all mention of the American Pharmaceutical Association on the stationery of the publication in question be prohibited ; and it was so ordered. It was then moved and carried that all reference to the *Mortar and Pestle* be expunged from the minutes. Professor Hallberg moved that the Association approve of an organization to manufacture and sell medicines for popular use, stating that such a procedure was a logical plan whereby the pharmacist may obtain relief from the patent medicine monopoly. A rising vote laid the motion on the table. The meeting thanked the retiring officers for their services. The newly elected officers were not present, hence they could not be installed at the time. There being no further business of the Section whatever, and the reading of the minutes having been voted down, the only session of the Commercial Section adjourned until next year's meeting.

SECTION ON SCIENTIFIC INTERESTS.

The first session of this Section was held on Friday, August 14th. President Good held a preliminary session of the Association proper, which he convened

at 10 o'clock in the forenoon. The applicants whose names had been read by Secretary Kennedy at a previous session were declared elected. The Committee on President's Address reported. The measures of legislation referred to and proposed therein were approved and ordered to be pressed until favorable action is secured. The Committee recommended that the General Secretary cable greetings to the International Exposition in Prague, Austria. This gentleman afterwards read greetings from the Wisconsin Pharmaceutical Association. He also read a letter from the Superintendent of the Mechanics' Institute of Montreal, in which that officer extended the privileges of the Institute to the members of the Association during their stay in the city. Secretary Kennedy read the minutes of a Council meeting, which stated that the body had elected its officers for the coming year, with Mr. W. S. Thompson, of Washington, D. C., as Chairman: J. M. Good, St. Louis, Mo., Vice-Chairman; and G. W. Kennedy, Pottsville, Pa., Secretary; and that Prof. Whelpley's proposition to allow periodicals to use the National Formulary free of charge, provided they did not publish more than fifty formulas per month, was accepted. The names of twenty-six more applicants for membership were read. The session then adjourned. At 10.55 Prof. Sadtler called the Section on Scientific Interests to order. He then delivered his address, which was devoted to

SOME THOUGHTS ON THE POSITION OF THE PHARMACIST AMONG THE GREAT FAMILY OF SCIENTIFIC STUDENTS AND WORKERS.

He would not, he said, stop to answer the sneering question which is sometimes asked concerning the right of the pharmacist to call himself a scientific man. "That is his birthright, and if he traces back the early history of chemistry, botany, or even medicine in its primary meaning as the curative art, he will find that they were cradled and fostered in the pharmacist's shop. If the modern pharmacist occasionally sells his birthright for the pottage of commercial gain, it cannot take from the earnest and conscientious worker inherited claims to a broad and important field of scientific activity."

The speaker then briefly defined the field and its limits which is peculiarly allotted to the scientific pharmacist. The study of pharmacognosy he considered the especial field that should be cultivated by the pharmacist. Thereby we are able to see that it antedates the history of modern chemistry, and in the Iatro chemists of the seventeenth and eighteenth centuries we recognize the scientific pharmacists of those days.

"But," he said, "it is not only the natural sources of medicinally active principles that should occupy the scientific pharmacist's attention. The raw materials which yield food preparations, and those which are the basis of many large chemical industries, equally furnish subjects which may properly attract the working investigator of the pharmaceutical profession. Few of us realize how extensive this field is and what enormous quantities of unutilized materials yet remain calling for investigation."

The speaker then called attention to another field, namely, that of organic synthetic remedies, which belongs to the pharmacist, but which practically he has lost by his inability to work it. In consequence, we pay to German manufacturers from four to six prices for products which we should produce at home if our large manufacturers could see fit to put the same amount of expert

chemical workers into their laboratories that the manufacturers of Germany do.

The next subject to which the attention of the audience was called was that of the methods of study and research which the modern worker in scientific pharmacy should follow. The difference in the amount of scientific study demanded twenty-five or thirty years ago and at the present time was dwelt upon, and the reason for the increase was declared to be two-fold. "A wider range of studies must be covered, owing to the broader demands which modern society makes of her educated citizens, and the interdependence of the several branches of science constantly becoming greater. The field before the scientific student of pharmacy has broadened, the methods of study have become more diversified, and the resources and facilities of our schools have been correspondingly increased. If we are as interested in the advance of pharmacy as we claim to be, let us not fail to be equal to our opportunities."

"To this end, the action taken last year, at the suggestion of my predecessor in this chair, of forming a Committee of Research would seem to be eminently proper. It has not yet, however, been productive of very extensive results. Possibly if the Committee were made larger and more representative, including more of the centres of pharmaceutical research, it might be made to accomplish more. While I make no recommendations on this subject, it is a matter which could well occupy the attention of the Section at one of its sessions. By a free interchange of opinion we could learn how to best stimulate the activity of all interested in this most desirable work."

The address was received and referred for publication. The Chairman then called for reports of committees. The committee appointed at Asheville, 1894, and continued at Denver last year, to investigate the question of indicators in the titration of alkaloids, submitted its report through Chairman Kebler. The committee had secured the continued services of Professor Lloyd, of Cincinnati, the assistance of Professor Bennett, of Ames, Ia., and of Professor Base and Dr. Engelhardt, of Baltimore. Brazil wood, cochineal, hæmatoxylin, lacmoid, tropæolin OO, and iodo-eosin were investigated in this connection. Considerable difficulty was experienced in securing some of the indicators of a satisfactory quality. This was especially true of tropæolin OO and iodo-eosin. Of the former none was secured satisfactorily sensitive, in the Chairman's opinion, but another member of the committee considered one sample satisfactory. Only one sample of iodo-eosin was obtained. All of the materials to be operated on, including the indicators, were sent to each worker, Accompanying the materials were instructions in detail for the preparation of the solutions of the indicators, regarding the amount of each solution to be used per titration, for the standardization of the volumetric solutions of sulphuric and hydrochloric acids and potassium hydroxide, and for operating on samples of quinine, cinchonine, strychnine, brucine, morphine, atropine, fluid extract of coca leaves, and powdered nux vomica and coca leaves. For the fluid extract and powders the following methods were prescribed:

Fluid Extract of Coca Leaves.—Ten grammes of the fluid extract are diluted with 10 grammes of distilled water in a 250 c.c. flask, 25 grammes of chloroform and 75 grammes of ether added, the vessel securely stoppered and well agitated. Add 5 grammes of 10 per cent. ammonia water and agitate the mixture frequently during half an hour.

(*a*) When the mixture has completely separated, pour off 50 grammes of the chloroform-ether mixture into a flask or beaker, evaporate the solvent on the water-bath, add 10 c.c. of ether and evaporate again. Dissolve the varnish-like residue in 15 c.c. of alcohol with heat, add water to slight permanent turbidity, add indicator and slight excess of acid solution and retitrate with centi-normal alkaline solution.

(*b*) When the mixture has separated entirely, pour off 50 grammes into a separatory funnel, treat at once with 20 c.c. of acidulated water; after thorough agitation and complete separation, remove the 20 c.c. of water into a second separatory funnel. Repeat the above operation twice more with 15 c.c. of acidulated water. The acidulated water in the second separatory funnel is rendered alkaline with ammonia water, the alkaloids removed successively with 20 c.c. and 15 c.c. of a mixture of 3 parts (by volume) of chloroform and 1 part of ether. Collect the chloroform-ether mixture in a tared flask and distil off the solvent. The varnish-like residue is twice treated with 8 c.c. of ether, evaporated on a water-bath, finally dried on a water-bath and weighed. The varnish-like residue is now dissolved in 15 c.c. of alcohol, with the aid of heat; then proceed as in *a* above.

For Powdered Nux Vomica and Coca Leaf.—Place 10 grammes of the dry drug into a 250 c.c. flask, add 25 grammes of chloroform and 75 grammes of ether, stopper flask securely, agitate well for several minutes, add 10 grammes of 10 per cent. ammonia water; agitate frequently and well during one hour. The suspended powder separates almost immediately, and the alkaloids are dissolved. On adding 10 grammes more of ammonia water and shaking well, the powder agglutinates into a lump, the liquid becomes clear after standing a few minutes, and can be poured off almost completely. Treat 50 grammes of the chloroform-ether mixture from the nux vomica according to processes *a* and *b*, the coca leaf according to process *b*.

The committee reported the following conclusions:

(1) Hæmatoxylin is the indicator par excellence for titrating alkaloids. Brazil wood and cochineal compare favorably with hæmatoxylin, but are not as reliable in some cases; nor do they appear to be quite as sensitive.

(2) Pure alkaloidal material can be titrated with satisfactory results, excepting the cinchona alkaloids. Such anomalous results were obtained with the cinchona alkaloids, that we are inclined to think that the nature of these alkaloids is not fully understood.

(3) The estimation of alkaloids by means of volumetric solutions can only be carried out in laboratories where daily determinations are made. If the operator is not constantly in touch with his end-reaction tints he will be unable to secure satisfactory results.

(4) The gravimetric results based on process *b* are quite satisfactory, and it is with this process that the average worker will obtain the most concordant results. While the volumetric process yields good results in the hands of extremely careful workers and under the most favorable conditions, yet we feel convinced from our work that the method has not been sufficiently evolved to recommend it for general use.

Respectfully submitted,

A. R. L. DOHME,

LYMAN F. KEBLER,

Chairman.

All of the operators did not adhere to the prescribed instructions, so that their results are not comparable with the results of the other members. Prof. Caspari, the third member of the Committee, discussed the difficulty of determining the end-reaction, and mentioned different efforts he had made in the work to carefully study the changes in color. He objected to the prescribed methods for standardization of the acid solutions, also to the use of alcohol in the titration of the alkaloids and alkaloidal residues. His views on this last-named objection will be found below, as he subsequently read a contribution embodying them. During the discussion which followed, the difficulty of detecting the presence of minute excess of alkali and acid, was mentioned. Prof. Lloyd spoke of a method used by Dr. Waldbott, of Cincinnati, for this purpose. It consisted in taking a small quantity of the liquid from the bulk by means of a capillary tube, and pressing the end of the tube against the test-paper, while the latter was allowed through capillarity to conduct the water away from the dissolved matter, thereby serving to concentrate the action at the point of contact, and make a perceptible change in the color of the paper. Referring to Brazil wood, Professor Rusby said there were at least two varieties in the market, but that, after much effort, he had not been able to trace them to their sources. Prof. Prescott reminded the Section of the difficulties experienced, until about fifteen years ago, in the titration of phosphoric acid, and stated that the anomalies in the estimation of the cinchona alkaloids volumetrically might still be overcome, as were the difficulties of that inorganic substance. Messrs. Hereth, Fennel and Payne also participated in the discussion, and Prof. Bartley moved that the committee be continued next year, as they were certainly ascertaining whether or not alkaloids could be estimated by volumetric methods. Chairman Eliel being absent, Prof. Bartley presented the report of the Committee on the Revision of the Pharmacopœia. It was referred to the next session for reading and discussion. Professor Prescott, as Chairman, reported for the Special Research Committee. The committee was granted authority over the expenditure of its appropriation. The work of the committee was presented at the following sessions. Besides these papers the committee had been engaged in outlining alkaloidal assay methods, to give the best uniform results in adjusting standards of strength for the active and poisonous drugs, in devising methods for the isolation of active principles, and in collecting bibliography, considerable of which had been called for during the year. Taraxacum, cascara sagrada, solanine, compounds of bismuth with organic bases and olive oil were prominent articles on the list of substances whose bibliography was being compiled. The Committee placed itself on record as not being responsible for the individual contributions of its members or associates. It was thought a distinctive function might be made for the committee by having it co-operate with the National Committee on the Revision of the United States Pharmacopœia in the investigation of one particular drug or matter of importance. The Committee recommended that subsequent committees be yearly elected for the same purposes, as it had existed. Professor Sadtler suggested that the Committee be made a part of the Section. The report was received and the recommendations approved and adopted.

There was considerable discussion regarding the manner and conditions under which the Committee should be continued. The question was finally referred to Messrs. Bartley, Prescott and Thompson for consideration, and

these gentlemen asked to report at the next session. A motion to have the committees of the Association receive financial aid for any help supplied the National Committee on Revision of the United States Pharmacopœia was lost. The Section then proceeded to nominate the officers for the coming year. Mr. Alpers, the Secretary of the Section, was proposed for Chairman. Prof. Sadtler was also put in nomination for a second term, but declined to have his name voted on. Profs. Coblentz and Scoville were named for the Secretaryship. The Section then adjourned until 8.15 P.M. At 3 P.M., the members left the Windsor Hotel for an electric car ride through the city, Outremont, Cote des Neiges, etc.

A second session was convened in the evening at 8.15. After Chairman Sadtler called the session to order, Secretary Alpers read the minutes of the first session, which were adopted as read. The session then proceeded to vote for the candidates for office nominated at the previous session. Mr. Alpers was unanimously elected Chairman. The session balloted for the gentlemen named for the office of secretary. Prof. Coblentz received the greater number of votes, hence was elected. His appointment was afterwards made unanimous. The first business of the session was the reading and discussion of the report of the Committee on the Revision of the Pharmacopœia. A considerable part of the report was composed of suggestions to substitute for essential oils artificially prepared substances, of which the oils in the main are composed, and the establishment of assay processes for certain oils. Very few of the members were in favor of the change to replace the natural oils in the Pharmacopœia with these artificial products, but an overwhelming majority of the members present was against this replacement; however, all agreed that methods of assay were desirable, and that variations in percentage content of important constituents should be decided upon and limited. This matter, as, indeed, most of the report, was referred to the Special Research Committee. A considerable and warm discussion followed the reading of the suggestion of the reporting Committee, to drop whiskey, brandy and the wines from the Pharmacopœia. Mr. Ebert claimed such an action would favor getting alcohol without a license, as no beverages would then be official. Much interest was elicited, and the matter was finally put in a motion to be voted on. The majority were for retaining these articles. There were a number of other articles mentioned in the report, but their consideration was referred either to the Special Research Committee or to the Séction on Materia Medica and Pharmacy of the American Medical Association.

Prof. Bartley, Chairman of the committee appointed to consider the advisability of continuing the Special Research Committee, and of arranging for the election of its members, reported that it was deemed favorable to elect four members to serve on the committee in question, in connection with the Chairman of the Scientific Section and the same officer of the Committee on the Revision of the Pharmacopœia, both *ex-officio;* that two of the four be elected this year for two years, and the other two for one year, thus making the body perpetual. The report was received and adopted. The names of the following gentlemen were presented to the meeting for choice: Messrs. Prescott, Lloyd, Patch, Coblentz, Trimble, Dohme and Kremers. The two gentlemen receiving the highest numbers of votes were to be declared elected for two years, and the two receiving the next highest numbers were to serve for one year. Profs.

Prescott and Lloyd were chosen for the two-year term, and Profs. Coblentz and Kremers for one year. A paper on

THE CAFFEINE COMPOUND IN KOLA.

By James W. T. Knox and Albert B. Prescott.

The history and literature of kola were first elaborated, then the results of an investigation of the fresh seed were given in detail. When a fresh kola seed is cut or bruised, a chemical change immediately takes place, as shown by the rapid change of color of the cut surface from pink or cream color to red-brown. On this account the authors sought a method of exhausting the seed without this change taking place. They found by dropping the slices of freshly cut kola into boiling water, or water at a temperature above 65°, that this result could be effected, but that alcohol at a temperature of 45° or higher was better.

For pharmaceutical purposes they found the best solvent for extracting kola to be alcohol of not less than 50 per cent. strength.

The authors next exhaustively considered the subject of kola assaying, and offered a process which they had found to yield uniform results.

In regard to the so-called glucoside of kola, or kolanin, they found the dilute acids to be unsuited to the purpose of recovering completely the alkaloids from their natural combination, so that lead hydroxide was tried, and a simple and effective process of liberating the caffeine devised. This reaction of kolanin with lead hydroxide, they considered, indicated a tannin-like character for the body. "There is reason to think that the glucose obtained by decomposing this so-called glucoside with mineral acids exists primarily in combination with the tannin-like body, for, after chloroform had removed all the caffeine from the mixture of alkaloids, treatment with water removed nothing further. The liberation of glucose, therefore, is not necessarily simultaneous with that of caffeine, nor in consequence of it. This was further shown by decomposing the lead salt formed by the red coloring matter, through treatment with hydrogen sulphide, and thereby recovering the colored body previously combined with the caffeine. This body so obtained gave all tannin reactions towards iron salts, alkaloids, gelatin, etc., and had a pronounced astringent taste, on treating it with dilute mineral acid, in the manner directed by text-books; very positive evidence of glucose was given, not only by its behavior with Fehling's solution, but with phenyl hydrazine as well. The foregoing facts would seem to indicate that the so-called glucoside is a combination of caffeine (and theobromine) with a glucoside tannin."

An "artificial kola-tannate of caffeine" was prepared by the following process:

An aqueous infusion of kola was poured into a 10 per cent. solution of caffeine acidulated with hydrochloric acid. The presence of acid was necessary to obtain an aqueous caffeine solution of sufficient concentration, and especially to avoid the re-solution of the tannate of caffeine which takes place in the neutral solutions in the presence of an excess of either tannin or caffeine. The precipitate, abundantly formed, was rapidly filtered at the pump, washed with cold water, and well drained. It was then dissolved in alcohol, and filtered to remove insoluble extraneous matter carried down in precipitation. The alcohol was then distilled off under reduced pressure until the solution had reached a

syrupy consistence, and the evaporation continued to dryness over sulphuric acid in a vacuum desiccator.

The product so obtained was found to have identical properties with the so-called kolanin.

The theobromine was estimated and found to be 1·51 per cent. of the total alkaloids present.

The tannin of the kola they separated as free tannin and combined tannin, the latter they considered as existing "in combination with the caffeine as the so-called glucoside," and was separated by treatment of the drug with lead hydroxide after the free tannin had been removed by 95 per cent. alcohol.

The following were the combustion results:

Duplicates.	Free Tannin.		Combined Tannin.	
	I.	II.	I.	II.
C	53·36	53·57	55·61	55·78
H	5·19	5·28	5·37	5·54
O	41·45	41·15	39·02	38·68

No discussion followed the summarizing of this paper by Professor Prescott, and the next paper read was on

TARAXACIN.

By L. E. Sayre.

Continuing the investigation recorded last year, the author has this time devoted his time exclusively to the study of the bitter principle, taraxacin. Fifty pounds of the drug were extracted with chloroform. The extract obtained from this solvent was digested in alcohol, the liquid decanted, evaporated to a small bulk and poured into an equal volume of water. This watery solution, after removal of alcohol by evaporation and from additional resin by decantation, contained the bitter principle. All proteid matter was removed by alternate treatment with alcohol and water and filtration. The bitter principle was capable of extraction from aqueous solution by agitation with immiscible solvents, like chloroform and ether, but they deposited it as a gummy mass. It was found that this gummy residue would yield crystals when treated with hydrogen peroxide, and a quantity of this oxidation product was obtained, which the author designated *taraxacic acid*. Quite a quantity of this acid was prepared by heating the impure bitter substance on a water-bath for some hours with dilute nitric acid, precipitating with lead acetate, removing lead with hydrogen sulphide. The filtrate from the lead sulphide was evaporated and the taraxacic acid crystallized out. This compound had an acid taste, but no bitterness, and was, therefore, considered distinct from the bitter principle; the latter, Professor Sayre thought, had more the nature of an aldehyde. He thought the practical results of this paper might be the discovery of a means of assaying taraxacum root, by converting the bitter principle into taraxacic acid, converting this into a lead salt and weighing it as such. "But, to my disappointment, on further studying this acid, by observing its crystalline form,

solubility in different solvents, by its behavior when heated to determine its melting-point, by sublimation, etc.—to my disappointment this crystalline substance was thus identified as oxalic acid, the oxidation product of so many organic compounds." A complete bibliography of taraxacum accompanied the paper.

After the reading of this paper the session took a recess until Saturday morning, when, at 9.35 o'clock, Professor Sadtler again called for order. The first paper read was on

POISONOUS HONEY.

By Lyman F. Kebler.

Poisonous honey has been known since the time of Cyrus, 500 B.C., as chronicled by Xenophon, and has been frequently reported since. The immediate reason for the present communication was a case of poisoning, near Princeton, N. J. The author had the opportunity of examining some of the honey, and separated a poison from it, as demonstrated on two cats. He was inclined to ascribe the poisonous property of this sample to andromedotoxin. It has been claimed by some writers that it is impossible to distinguish the poisonous article, although the early travellers in North America usually avoided that which had a dark color. A lengthy and valuable bibliography accompanied the paper. In the discussion that followed, Prof. Rusby said he thought it quite impossible that such poisons should find their way to the nectaries of the flowers and then to the honey. Mr. Alpers inquired what effect these poisons would have on the bees. Prof. Rusby replied none, as the nervous organization of the bee is such as to be unaffected by these substances.

The second session of the Scientific Section was then adjourned. Immediately after this adjournment, President Good called a short general session to listen to the minutes of Council. Edward Shumpik, of Minneapolis, Minn., was selected by Council to serve as Local Secretary at the next meeting, which is to be held in 1897 at Lake Minnetonka. There being no further business, this session adjourned.

The third and last session of the Scientific Section was then begun, with Prof. Sadtler as presiding officer. The reading of the minutes of the second session was dispensed with, upon motion. A paper was then read on

CANADIAN POTASHES,

By T. B. Reed,

in which, in addition to other valuable information, he stated that the output in 1895 amounted to 1,500,000 pounds.

GELATIN CAPSULES,

By W. C. Alpers,

was the subject of the next paper; this paper is printed in full in this number. The author showed a model of his device, and practically illustrated its working. A paper was then read on

SOME RESULTS OBTAINED IN THE DESTRUCTIVE DISTILLATION OF LINSEED OIL, WITH REMARKS ON ITS BEARING ON ENGLER'S THEORY OF THE ORIGIN OF PETROLEUM.

By Samuel P. Sadtler.

This paper is also published in the present issue. He exhibited a sample of the original oil and samples of the fractions obtained during the distillation.

The highest of these fractions separated scale paraffin on standing. A residuum was left after the distillation, which was similar to that obtained in petroleum distillation.

Prof. Lloyd referred to some legal proceeding against parties in Ohio for alleged adulteration of linseed oil with paraffin oils. He said he hoped this matter would be brought to their notice. Messrs. Fennel, Remington, Caspari and Payne also spoke of the significance of this valuable contribution to the knowledge of fixed oils. The next paper was entitled

MIXTURES OF SOLIDS FOR INTERNAL USE.

By C. S Hallberg.

He reviewed the various forms into which solids have been put for internal administration, such as powders, pills, uncoated and coated, finally coming to compressed goods, such as tablets and tablet triturates. He objected to these on the ground of insolubility in many cases, and for the reason that the skill of the pharmacist had not been applied in preparing them. He was in favor of powders compounded on physicians' prescriptions, and stated that he believed the business of the retail pharmacist would be improved thereby. He concluded with a list of the kinds of medicinal agents that he believed should be administered in no other form than that of powder if given in the solid condition. A paper previously referred to in this report as having a bearing on indicators was next presented on

ALCOHOL AS A SOURCE OF ERROR IN THE TITRATION OF ALKALOIDS AND ALKALOIDAL RESIDUES.

By Charles Caspari, Jr.

The paper arose through some discrepancies which were noticed in the work of the author as one of the members of the Committee on Indicators. To test his belief that the trouble came through the use of alcohol, the author made a series of experiments in which he used water, alcohol and diluted alcohols of various strengths, both separately and in combination with alkaloidal materials. The author stated that alcohol appeared to play the part of an acid toward all of the indicators examined by the committee except tropæolin OO ; in the use of this it seemed to act as an alkali. The author stated the conclusions forced upon him as a result of the observations above enumerated are, that far more accurate volumetric determinations of alkaloids and alkaloidal residues can be made in water alone than in mixtures of the same with alcohol, and that the error caused by the latter is augmented as the proportion of alcohol is increased.

Professor Bartley inquired of the author whether the alcohol had been purified, as it might have been acid through oxidation. Professor Caspari replied that it had not, but that the two brands used were both free from acid, in fact, were neutral to litmus. Mr. Kebler said litmus was not sufficiently delicate for determining the presence of alkali or acid in such cases.

Professor Prescott suggested that the formation of ethyl salts might have something to do with the difficulty. Professor Caspari replied that he did not believe the conditions favorable to the formation of such substances, and that the only explanation that can be offered for this peculiar behavior of alcohol is on the basis of Arrhenius' theory of electrolytic dissociation, as detailed in the

writings of Professor Ostwald. According to the latter authority, indicators also depend for their value entirely upon dissociation, and, although the various alcohols have a dissociating effect upon salts held in solution by them, it is less marked than in the case of water, and decreases with the increasing molecular weight of the alcohol. Professor Lloyd said he had recently returned two barrels of alcohol to the dealer, for the reason that acetic ether was present in considerable quantity.

Mr. Kebler stated that absolute alcohol, as purchased, is almost always alkaline, probably through small quantities of alkali carried over mechanically during distillation.

THE HISTORY OF RHAMNUS PURSHIANA.

By J. U. Lloyd.

This is printed in full on page 467 of this number. Professor Rusby believed that the bark upon which the reputation of the drug was based was from Rhamnus Californica, and that the bark of Rhamnus purshiana had been substituted shortly after the introduction to general medical use. He stated that Rhamnus Californica was a shrub, while Rhamnus purshiana is a tree. He thought the bark of either species might be admitted into the Pharmacopœia. The next paper was

STROPHANTHUS SEEDS.

By S. E. Jelliffe.

He discussed the reasons for believing that biological changes had taken place in the case of this drug, and that, from the small brown seed of Strophanthus hispidus, through the seed of Strophanthus gratus and Strophanthus asper, a regular gradation to the long green seed of Strophanthus Kombé exists.

In reply to a question by Professor Rusby as to whether there was any special feature that might be used to detect the drug in the form of powder, the author gave a negative answer.

THE MENTHOL GROUP,

By W. O. Richtmann and Edward Kremers,

was presented by the latter. This, the fourth communication on the same subject, was mostly confined to a fundamental study of the physical constants of menthene, its nitroso-chloride and several other derivatives, in order to examine certain statements regarding the melting-point of the nitroso-chloride, which appeared inconsistent, and to prevent the multiplication of similar incongruities. The investigation is being continued.

Professor Kremers also presented papers

ON THE CHEMICAL COMPOSITION OF OIL OF MONARDA FISTULOSA.

By E. J. Melzner and Edward Kremers.

ON THE CHEMICAL COMPOSITION OF OIL FROM MONARDA PUNCTATA.

By William R. Schumann and Edward Kremers.

These two contributions will be printed in full in this Journal.

PREPARATION OF BORNEOL FROM SYNTHETIC PINENE.

By John William Schempf.

After detailing the work of Bertram and others in this line of investigation, the author supplemented their results by an account of his own study of the action of Bertram's reagent (acetic acid and 50 per cent. sulphuric acid) on synthetic pinene. He succeeded in separating considerable quantities of borneol, one lot having a melting-point of 198° to 199°, and another melting at 195° to 197°. The product in both cases was optically inactive.

PRODUCTS OF THE UNITED STATES PHARMACOPŒIA.

By C. T. P. Fennel.

The author criticized many of the standards of the U. S. P., and suggested a number of changes. His paper was accompanied by the results of analysis.

VALUATION OF WILD CHERRY BARK.

By A. B. Stevens.

During the past year, as a continuation of a paper read at the Denver meeting, he had made comparative studies of several methods of estimating the amount of hydrocyanic acid obtainable from wild cherry bark. Having found that the addition of sodium chloride to the distillate before titration of it with silver nitrate, as proposed by Dr. Dohme, made no difference in the results, the author disproved of such addition. His results pointed to the fact that wild cherry bark decreases in strength when kept in stock. In accordance with his results, published on p. 482, of this Journal, for 1895, he found that the green bark yields the least hydrocyanic acid, the bark of the twigs more, and the bark of the trunk the greatest amount. Mr. H. K. Mulford then read an account of the preparation of "Antitoxin" for diphtheria.

WHAT IS THE NATURE OF THE MODERN DIETETICS USED IN MEDICINE AND PHARMACY?

By F. E. Stewart.

In his prefatory remarks the author stated that "several queries in relation to various individual food preparations have been answered by papers read before the Association during the past three or four years," and that "it is the purpose of this paper to set forth some general principles regarding the class of substances which, in the hands of physicians to-day, are truly remedial agents and perform this function." Secretary Alpers then read the following papers by title:

ANTITOXIN.

By Dr. C. T. McClintock.

SALOL.

By Dr. F. Hoffmann.

PEPSIN TESTING.

By C. C. Sherrard and J. L. Tegarden.

THE UNITED STATES PHARMACOPŒIA PEPSIN STANDARD.

By C. C. Sherrard.

A METHOD FOR THE DETERMINATION OF PHOSPHORIC ACID IN SOLUBLE FERRIC PHOSPHATE, U. S. P.

By W. A. Puckner and Frank Julian.

The authors first called attention to the fact that, while there are numerous excellent processes for determining the iron in this preparation, no exact method for estimating the phosphoric acid in the compound is known, since the operation is complicated by the presence of both iron and citric acid. They first tried some of the methods of estimating phosphoric acid in the presence of iron, and gave preference to that of Neubauer (Inaug. Diss. Rostock, 1893). In estimating official iron phosphate they examined the methods of getting rid of the citric acid, and gave preference to that in which nitro-hydrochloric acid is used.

The following details were given: Weigh 1 to 1·5 grammes of iron phosphate into a Kjeldahl digestion flask, dissolve in 25 c.c. water, add 10 c.c. concentrated nitric acid and 3 c.c. strong hydrochloric acid, and boil until reduced to 5 or 10 c.c.; transfer to a beaker, washing the flask with about 25 c.c. of water, add 250 c.c. of molybdate solution and digest at 40° for four hours. Decant the clear liquid through a small filter and wash the precipitate, retaining as much as possible in the beaker, with several small portions of molybdate solution, until the filtrate remains clear after making alkaline with ammonia, and therefore, is free from iron. The phosphomolybdate of ammonia is now to be dissolved in 25 c.c. of 10 per cent. ammonia water. When solution has taken place, it is filtered through the same filter, and the beaker and filter washed with 75 c.c. of water. Now 25 c.c. magnesia mixture are added, at the rate of 50 to 100 drops per minute, and with constant stirring. After standing eight hours or over night, the precipitate is transferred to a Gooch filter, using portions of the filtrate for the purpose, and finally the precipitate is washed with 2·5 per cent. ammonia water until free from chlorides (25 c.c. are usually sufficient). The precipitate is dried thoroughly at 100° to 120°, then gradually heated to bright redness, and retained at this temperature for fifteen minutes, cooled and weighed.

All of the papers were referred to the Publication Committee. The officers for the ensuing year were installed, and a vote of thanks given the retiring officers. The minutes were read and approved, and adjournment ordered.

SECTION ON EDUCATION AND LEGISLATION.

The first session of the Section on Pharmaceutical Education and Legislation met at 3 o'clock on the afternoon of Saturday, August 15th. The Chairman, Prof. Hallberg, commenced the business of the session by appointing Messrs. Sheppard, Bartley and Heusted a committee on his address, in case the members should desire to refer it to such a body for consideration. The address dealt with the subjects of education, legislation, physicians' dispensing, etc., and contained certain recommendations which are hereafter mentioned as having been approved by the committee to which the address was referred.

The Secretary of the Section then handed in his report. He had collected statistics concerning registration of pharmacists and assistants during the past year. Many of the Boards were unable to report and many would not. After careful consideration of all the facts, the writer was of the opinion that a State

is as well off without a law as with one, unless the Board is supported by a live State Pharmaceutical Association. He also gave the number of graduates during the past year. He thought all licentiates should first be registered as assistants. The reports of the Committees on Scholarship and on Registration of Poisons followed. The nomination of officers for the following year was then taken up. Profs. Beal and Hallberg were named for Chairman, and the same gentlemen in reversed order were mentioned for the Secretaryship. The first paper read was

CONCERNING THE CHARACTER OF STATE BOARD OF PHARMACY EXAMINATIONS.

By Harry B. Mason.

The author stated that it was his purpose to declare, first, that nearly all of the examinations held by State Boards of Pharmacy are of such character that the "quiz-compend" student is the one most successful in passing them; second, that the "quiz-compend" student is not the competent pharmacist; and third, that, therefore, to perform the high duty expected of them, the examinations must be changed in character, until only the competent pharmacist will be successful. Concerning this necessary change in character, he offered some suggestions to obviate these objections: ask, first, the use of knowledge and of faculty, which does determine fitness; and second, instead of asking single facts, duplicate the exigencies of practice themselves (using, if you will, only those more ideal), for then only such knowledge will be required as is necessary to competent service. To this end, bring into prominence problems in percentage composition, in specific gravity, in alligation. Ask speculative questions of importance, as to what course would be followed in a given case. Duplicate ideal prescription-desk necessities. Ask few isolated facts, but demand their combination and use, as is necessary in practice, of which the Board should be representative.

To do this, only those questions should be asked which demand, not the use of an unaided memory, but of reasoning, creation and judgment, and the possession and use of assimilated knowledge.

But though the applicant successfully acquit himself along these lines, he has not yet proved his real competency. He may lack sufficient shop experience. Shop experience gives the student the true perspective of the field of knowledge. Surround him, therefore, with the necessary appurtenances of his art, and then subject him to the same demands that are made of him in the prosecution of his regular duties.

If an applicant is to be examined with intent to discover his real efficiency, neither of these divisions of this scheme of examination can be sacrificed.

A COMPARATIVE EXHIBIT OF PHARMACY BOARD EXAMINATIONS.

By C. S. Hallberg.

By communication, he had received nineteen replies from as many State Boards; they sent him one or more sets of their questions. He, with the officers of the Section, collated these into a tabular statement. The questions were divided into sections, as chemistry, pharmacy, etc., and then subdivided, so that a comparison could be made. While he favored oral examinations, the author believed they should only supplement the written ones.

SUGGESTIONS TO BOARDS OF PHARMACY IN CONDUCTING THEIR EXAMINATIONS.

By H. M. Whelpley.

He denounced the "quiz-compend" fiend. This was followed by a second paper on

SAMPLE EXAMINATION FOR THE AVERAGE STATE BOARD OF PHARMACY.

By H. M. Whelpley.

This was a printed list of specimen questions. The preceding papers were then taken up for discussion. Dr. T. B. Reed opened with a rather severe criticism of a number of the questions proposed by Prof. Whelpley in the last paper. Some of these he characterized as absurd, as it is not the province of a Board of Pharmacy to ask a student what books he has studied. Referring to Mr. Mason's paper, Prof. Remington said he was glad to hear a criticism from a student's standpoint. He was opposed to examiners rating on a purely numerical basis, as questions are not of equal value. Mr. Holzhauer concurred with Prof. Remington, and added that he was afraid (as a member of the New Jersey State Board for fifteen years) the questions were becoming too difficult, and that very few of the examiners could answer the questions correctly themselves. He thought a Board should consider the locality in which the candidate is situated, and that some of the questions of Dr. Whelpley—like those in microscopy and volumetric analysis—were entirely too difficult; that what a State Board should do is to determine whether the applicant is competent to conduct the drug business. Several members asked about the percentages of correct answers required by the Boards, and whether all of them had but one set of questions. They were informed that some Boards had two sets; also, that some Boards grant an assistant's certificate in case the applicant has failed to secure a registered pharmacist's license—provided, of course, he answered enough questions properly to entitle him to it. The discussion was at some length, and was also participated in by Messrs. Chapman, Alpers, Butler, Payne, Good, Mayo, Frost, Williams, Burge, Bartley and Mason. The session then adjourned until 8.30 P.M. The reading of the minutes of the first session was dispensed with. The officers were re-elected for another year. The committee on Chairman Hallberg's address then reported that they approved of his recommendation to submit the matter of preliminary education to the various State Associations for consideration, and report at the next meeting. They also approved of his recommendation to limit the use of the degree of Pharmaceutical Chemist to those who had graduated without having experience in drug stores, and of having the degree of Graduate in Pharmacy imply that its holder had served drug-store experience. They also approved of his belief that State laws should require all applicants to be examined. The report was received and adopted by the session. A resolution was then offered to the effect that an annual renewal of registration is desirable. The motion on this was carried unanimously. A paper was then read, entitled

A DUTY OF PHARMACISTS TO THEIR UNREGISTERED APPRENTICES.

By H. M. Whelpley.

Chairman Hallberg presented

THE PEDAGOGICS OF PHARMACEUTICAL EDUCATION.

By Joseph Feil.

The next paper was entitled

TO WHAT EXTENT SHOULD A CANDIDATE FOR REGISTRATION IN PHARMACY BE REQUIRED TO BE FAMILIAR WITH THE SUBJECTS OF MICROSCOPY AND VOLUMETRIC ANALYSIS?

By T. B. Reed.

It was in answer to a query by the Section. The author said:

"As a man might be a safe man and a successful pharmacist without any practice in Volumetric Analysis or Microscopy, the best proof of which is that many of the prosperous, and even leading men, who are appointed to Boards, have no practical knowledge of these subjects, it seems to me that Volumetric Analysis and Microscopy need not be included in Board examinations for registration."

The matter was discussed by Messrs. Alpers, Stevens, Sheppard, Bartley, Thompson and Whelpley.

A COMPARATIVE EXHIBIT OF UNITED STATES PHARMACY LAWS.

By J. H. Beal.

This gentleman has been engaged for several years past in making a thorough study of pharmaceutical legislat on, and the members of the Section expressed themselves as appreciative of this fact.

SOME ODDITIES IN PHARMACY LAWS,

By J. H. Beal,

clearly showed the contradictory and irregular ways in which many of the State laws are framed. An answer to a query

CONCERNING THE SALE OF INTOXICATING LIQUORS BY DRUGGISTS.

By H. M. Whitney.

Mr. Sheppard explained the state of affairs in this matter in Massachusetts. Mr. Ebert was of the opinion that if the spirituous liquors were dropped from the Pharmacopœia many druggists who deal largely in these would go out of business, the latter being thereby improved.

PRACTICE *VS.* THEORY.

By S. P. Watson.

CONCERNING UNIFORMITY OF PHARMACEUTICAL LEGISLATION.

By J. H. Beal.

He said:

The United States had forty-nine pharmacy laws, and, therefore, forty-nine kinds of experience. As a national pharmacy law is impossible under the present Constitution, Professor Beal offered a resolution that the President appoint a committee of three to enter into consultation with the State Boards of Pharmacy, the Committees on Pharmaceutical Legislation of the State Associations and the Colleges of Pharmacy of the United States and Canada, for the purpose of drafting the form of a model pharmaceutical law. This duty was afterwards referred by vote to the officers of the Section on Pharmaceutical Education and Legislation. Reprints of Professor Beal's papers were ordered to be made and sent to the State Associations and Boards, and to the pharmaceutical periodicals. A paper was then presented, entitled

PHARMACEUTICAL JURISPRUDENCE.

By Joseph Jacobs.

All of the papers were referred to the Publication Committee. The re-elected officers were installed for the coming year, and given a vote of thanks for the past year's services. The reading of the minutes was dispensed with, and the last session of the Section adjourned.

FINAL GENERAL SESSION.

President Good called the Association to order at 10.30 A.M., on Tuesday. Secretary Caspari read the minutes of the second General Session and of the short General Sessions held just before the conventions of the several Sections. The minutes were approved, as were also those of the third meeting of the Council, which were read by Secretary Kennedy of that body. Up to the time of this report the latter gentleman had read the names of 112 applicants for membership. Those who had not previously completed their membership were now extended the invitation to do so. Chairman Payne, of the Committee on the Status of Pharmacists in the United States Army and Navy, then submitted his report, which showed the thorough manner in which the committee had been endeavoring to secure for the naval apothecaries and hospital stewards the proper recognition of their required abilities. The report was exhaustive and dealt with the statistics of examinations. The Committee felt much encouraged at the present prospects and are confident of success. The aim is to have the positions made sufficiently attractive to draw the attention of competent pharmacists. The committee will try to bring their bill to a vote at the next session of Congress. The report of the committee was received, approved and referred for publication. It was considered by some members desirable to have the co-operation of the American Medical Association. The Association expressed itself as appreciative of the efficient services of Mr. Payne as Chairman of the Committee. Professor Ryan read his report as Chairman of the Committee on Metric Weights and Measures. He spoke of the friendly attitude of merchants and of the press in general toward the adoption of the Metric system. These committees were ordered to be continued as proposed by President Good in his address, and were instructed to proceed without necessarily consulting State associations. Secretary Caspari read the report of the Committee on Transportation. This body had been unable to secure a reduction of railroad fare for the members living west of the Rocky Mountains. In connection with this report an amendment to the by-laws was proposed, to the effect that the Local Secretary need not be the Chairman of the committee unless convenience sanctioned it. The committee appointed to consider the President's address approved of the measures recommended by him. It recommended that his suggestions regarding the revision of the United States Pharmacopœia be made a special topic for discussion at the next meeting, and that the same topic be referred to the various State associations. This committee also recommended that the Committee on National Legislation be not only continued, but enlarged from three to five members, and that one of these be from the Dominion of Canada, in order that the interest be made international, and all to be appointed by the incoming President. The report of the committee was adopted.

Regarding the admission of certain "synthetic remedies" into the Pharmacopœia, Mr. Sheppard offered a resolution to the effect that it was the sense of

the Association that Congress should enact laws, rules and regulations concerning matters of copyright and patents on medicinal products, to protect this country against the invasion of foreign countries, which annually take large sums of money from the United States for such articles. The resolution was adopted. Prof. Hallberg offered the suggestion that a committee of five be appointed to collect facts concerning the use of alcohol by pharmacists, and to advise the Senate Committee having the subject of tax-free alcohol under consideration. This was also ordered. Secretary Caspari read a communication from the Nebraska State Pharmaceutical Association, in which that organization extended greetings and an invitation to the American Pharmaceutical Association to meet in Omaha in 1898. Mr. Mayo then put in a plea for New York for 1898, and Mr. Dohme reminded the meeting that he had previously spoken for Baltimore for that year. These matters were then referred to the next committee on time and place of meeting. A motion to amend the by-laws so as to make it imperative for an applicant to pay his first annual fee on the date of his application was discussed for some time, and finally tabled.

Mr. Hopp then offered a resolution to the Association to permit the Chairman of the Section on Commercial Interests to convene that body at the end of the last general session of the next meeting, if, in his opinion, it is necessary. This was held over to be taken up at the first general session next year. It was ordered that requisition for stationery should hereafter be made to the General Secretary; also, that the badges and bars of the Association should be placed in the hands of the Local Secretary for sale. The Local Secretary for next year was elected Chairman of the Entertainment Committee. A vote of thanks was then tendered to all the people of Montreal, at whose hands the Association had met so much and generous hospitality. Mr. Chapman, of Montreal, replied to this courtesy. President-elect Morrison spoke of the state of the finances of the local committees, and showed that the arrangements for entertaining the visiting members had been successfully carried out.

President Good appointed Messrs. Hereth and Chapman to conduct the newly-elected officers to the chair, where they were officially installed by him. The retiring officers were given a rising vote of thanks. President Morrison then appointed Messrs. Stewart, Ebert, Thompson, Muir and Squibb, a Committee on National Legislation; Messrs. Eliel, Bartley, Stevens, Searby and A. R. L. Dohme, a Committee on the Revision of the Pharmacopœia; Messrs. Hereth, Payne and Chapman a Committee on General Prizes; also the Delegates to the American Medical Association and the National Wholesale Druggists' Association, the latter of which is to meet in Philadelphia on October 5th. The reading of the minutes of the session were dispensed with. Mr. Mayo proposed that a committee of five be appointed to consider the advisability and feasibility of having the meeting of 1900 on board of a steamer en route to Europe. This was approved. To extend the time of the present meeting as arranged by the Council, Professor Ryan made a motion that the Association adjourn until 9 o'clock on the morning of August 26, 1896, and it was so ordered.

In the morning and afternoon of Monday, August 17th, the members of the Association and their friends took a trip through the Lachine Canal, Lake St. Louis and Lachine Rapids; in the evening they attended a concert in the Windsor Hall.